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The Journal of
THE ROYAL AERONAUTICAL SOCIETY

SPECIAL NUMBER

Commemorating
THE SOCIETY'S
80TH
ANNIVERSARY

1866 · 1946

JANUARY 1946
NO. 421 VOL. 50

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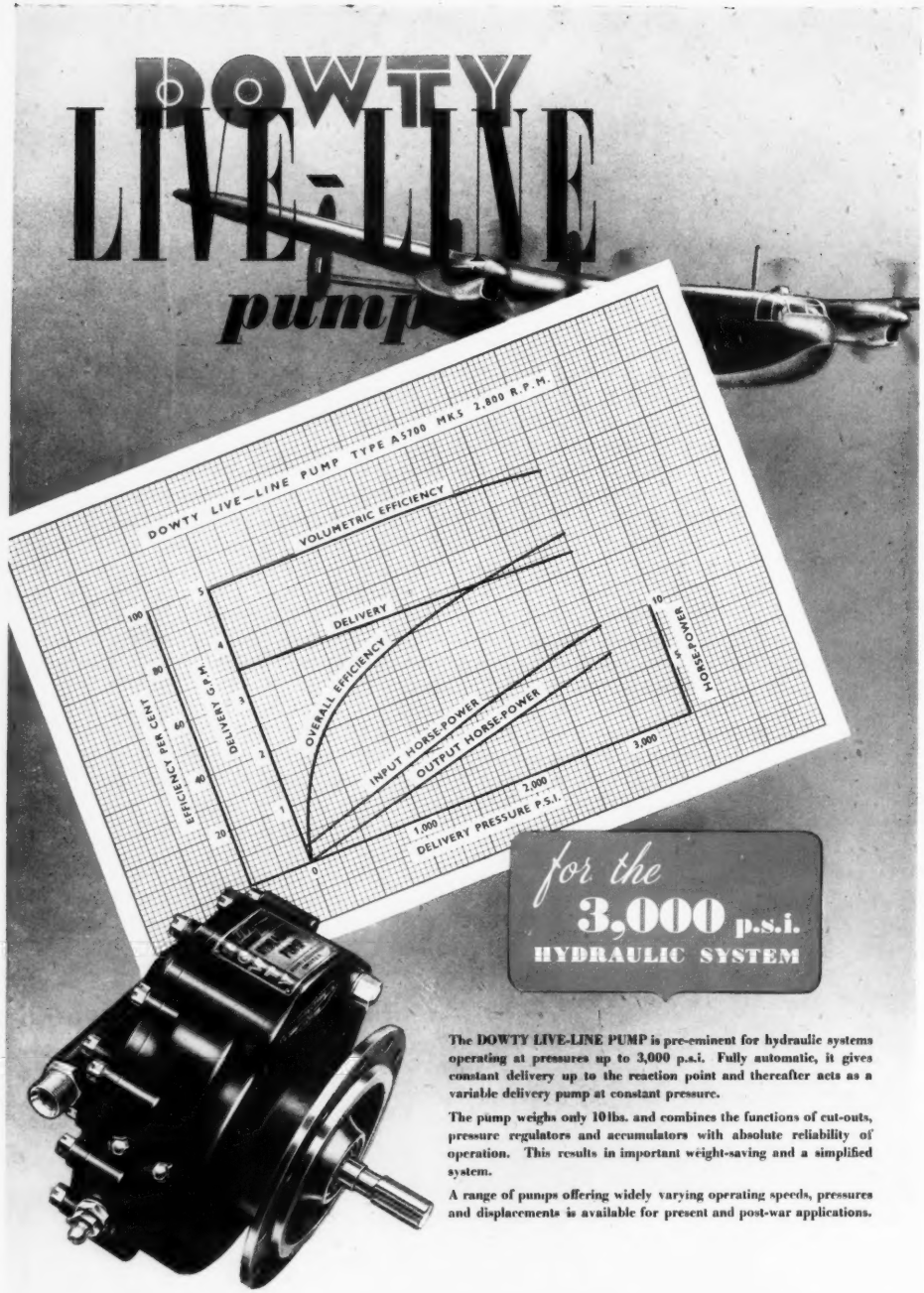

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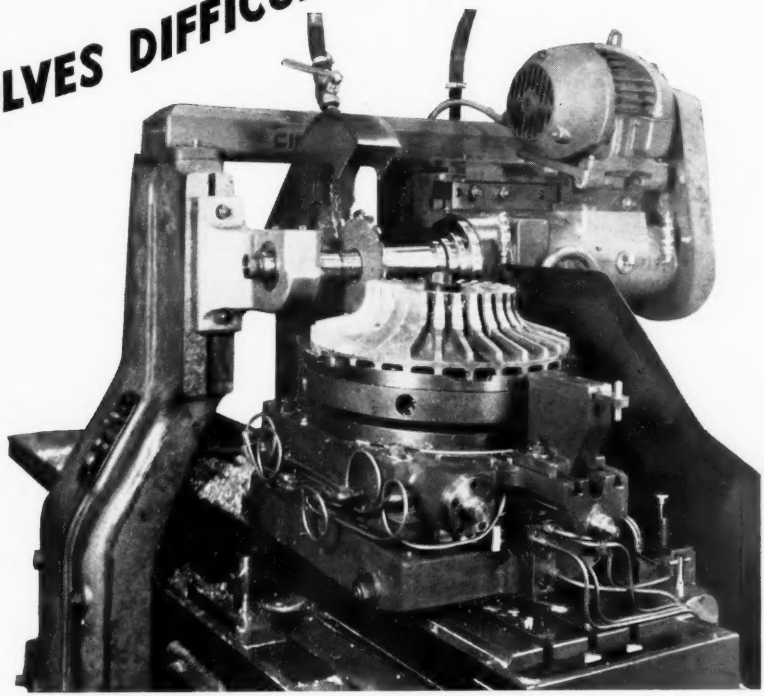

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THE SOCIETY'S AWARDS

The Society offers a number of valuable awards, most of them annually. Full particulars of the conditions attaching to these awards may be obtained on application to the Secretary.

Society's Gold Medal

This is the highest honour which the Society can confer for work of an outstanding or fundamental nature in aeronautics.

British Gold Medal for Aeronautics

The British Gold Medal for Aeronautics is awarded for an achievement leading to advancement in aeronautical science.

Simms Gold Medal

The Simms Gold Medal is awarded annually for the best paper read in any year before the Society on any science allied to aeronautics, e.g., meteorology, wireless telegraphy, instruments.

The George Taylor (of Australia) Gold Medal

The Taylor Gold Medal is awarded annually, at the discretion of the Council, for the most valuable paper submitted or read during the previous session.

Wakefield Gold Medal

The Wakefield Gold Medal is awarded annually to the designer of any invention or apparatus tending towards safety in flying, and is open to members or non-members.

Society's Silver Medal

The Society's Silver Medal is awarded, at the discretion of the Council, for some advance in aeronautical design.

British Silver Medal for Aeronautics

The British Silver Medal for Aeronautics is awarded for an achievement leading to advancement in aeronautical science.

Society's Bronze Medal

The Society's Bronze Medal is awarded, at the discretion of the Council, under the same conditions as those for the Silver Medal, but for some less important advance in aeronautical design.

Wilbur Wright Memorial Premium

The Wilbur Wright Memorial Lecture is held annually, a premium of fifty pounds being awarded to the lecturer invited by the Council to deliver the lecture. The lecture is usually given alternately by an American and an Englishman, and is the most important aeronautical lecture of the year. It is delivered whenever possible, on the last Thursday in May of each year.

British Empire and Commonwealth Lecture

The Council of the Royal Aeronautical Society have completed the arrangements for the founding of a British Empire and Commonwealth Lecture.

The lecture, on any aeronautical subject approved by the Council, will be delivered annually in September in London, by a lecturer, chosen in alternate years from the British Dominions and Colonies and Great Britain.

The Council, by founding this British Empire and Commonwealth Lecture, are anxious to encourage new ideas and new points of view from all parts of the British Empire and Commonwealth, and to make the Lecture second only in importance to the Wilbur Wright Memorial Lecture.

The British Empire and Commonwealth Lecture will have a premium of £50 attached to it, and in the case of lecturers coming from the Dominions and Colonies an allowance up to £100 will be paid towards the Lecturer's expenses.

R.38 Memorial Prize

The R.38 Memorial Prize is offered annually for the best paper received by the Society on some subject of a technical nature in the science of aeronautics, preference being given to papers which relate to airships. The prize is twenty-five guineas.

The Herbert Akroyd Stuart Lectures

Under the will of the late Mr. Herbert Akroyd Stuart a sum of £700 is held in trust by the Society for the offer of a prize every two years, for the best paper or lecture read or given before the Society dealing with the Origin and Development of Heavy-oil Aero Engines. The prize is open to members and non-members.

Edward Busk Memorial Prize

The Edward Busk Memorial Prize is offered annually for the best paper received by the Society on some subject of a technical nature in connection with aeroplanes (including seaplanes). Its value is twenty guineas.

Pilcher Memorial Prize

The Pilcher Memorial Prize is offered annually, at the discretion of the Council, for the best paper by a Student on heavier-than-air craft or any analogous subject. Its value is five guineas.

Usborne Prize

The Usborne Prize is offered annually, at the discretion of the Council, for the best paper by a Student on some subject in connection with Aero Engines. Its value is five guineas.

Major Baden-Powell Memorial Prize

The Major Baden-Powell Memorial Prize is awarded in May and December of each year to the student who is considered the best student by the examiners in the Society's Association Fellowship examinations. Its value is three guineas.

Elliott Memorial Prize

The Elliott Memorial Prize is awarded twice yearly to the apprentice at Halton who has the highest percentage of marks in the passing-out examination. Its value is $2\frac{1}{2}$ guineas for each award.

R. P. Alston Memorial Prize

The R. P. Alston Memorial Prize is awarded to any Graduate or Student of the Society for work done leading to improvement in the safety of aircraft, and particularly for improvement in stability and control. Its value is approximately £5.

Branch Prize

The Council offer an annual prize of twenty guineas for the best paper read before the Branches during the previous lecture Session. The prize is open to any member of the Society or of any Branch.

Journal Premium Awards

The Council has set aside an annual sum of £250 to be given as premium awards to authors of papers published in the Journal.

AN APPRECIATION

The Council of the Royal Aeronautical Society wish to thank those Companies who, by their generous co-operation, have done so much to help in the production of the Journal in its new form.

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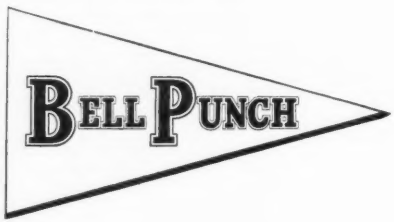

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THE ROYAL AERONAUTICAL SOCIETY

With which is incorporated The Institution of Aeronautical Engineers

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The Journal of The Royal Aeronautical Society was founded in 1897 in succession to the Annual Reports. For the opinions expressed in Papers that are signed or initialled the authors alone are responsible. None of the papers or paragraphs must be taken as expressing the opinion of the Council of The Royal Aeronautical Society unless such is definitely stated to be the case. **The Journal is published monthly at the Offices of the Society, 4, Hamilton Place, Piccadilly, London, W.1.** Subscriptions per annum, £4 13 0 including postage; Single Numbers 7/6 or 7/9 post free. All communications for publication in the Journal, or on general matters affecting the Society should be addressed to — The Secretary, J. Laurence Pritchard, 4, Hamilton Place, W.1. The Society's Bankers are Messrs. Coutts and Co. All communications respecting Advertisement matters should be addressed to—The Advertisement Manager, Journal of The Royal Aeronautical Society, 4, Hamilton Place, W.1.
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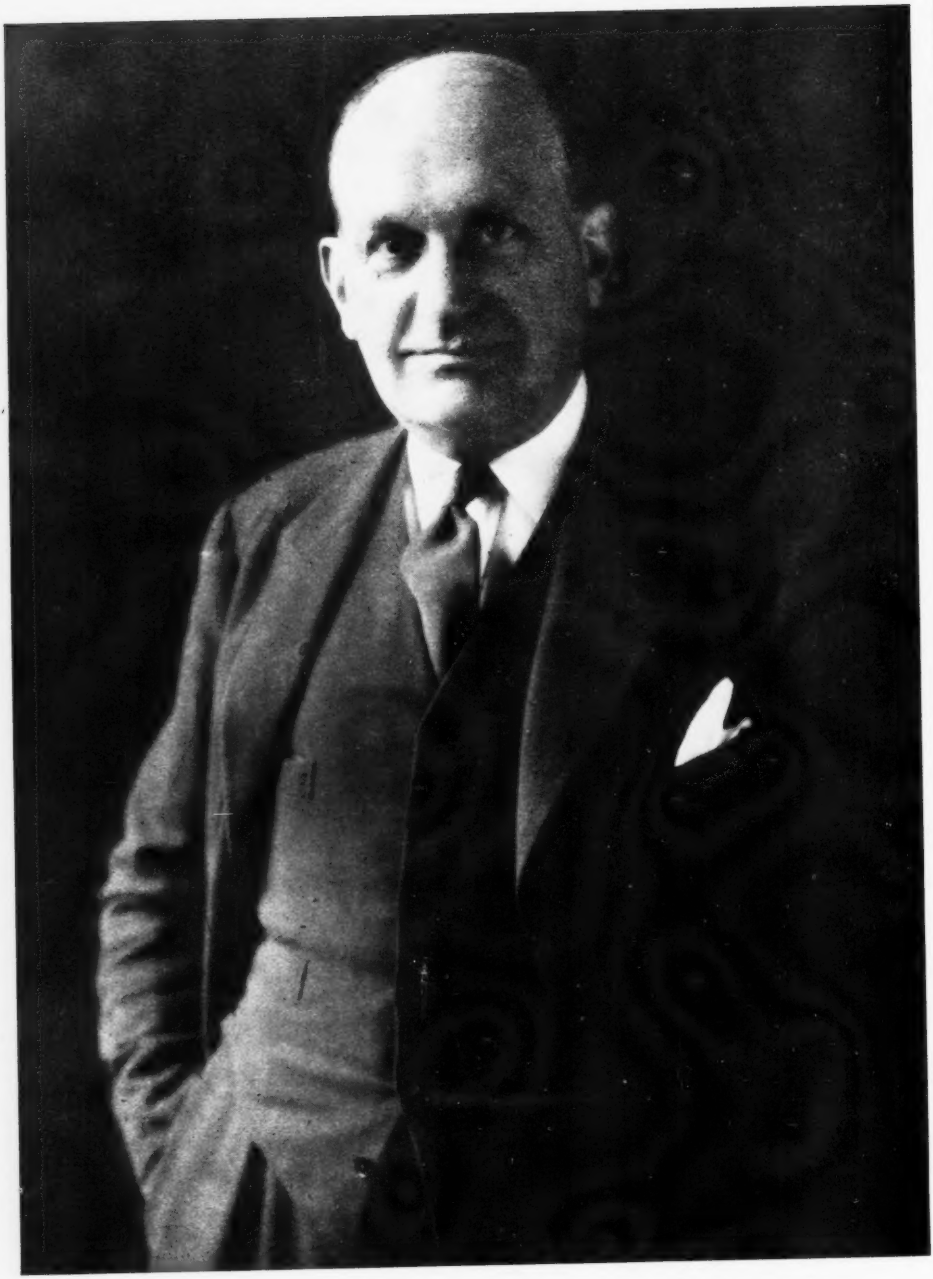


SIR FREDERICK HANDLEY PAGE, C.B.E., F.R.Ae.S.

A Message from the President

IN THE LONG HISTORY of the world there have been periods of high adventure, periods when pioneers went forth boldly to explore the unknown world of the spirit and of the material which lay around them.

Most of those who then lived were unaware of the pioneers' work going on in their midst, were unaware even of the pioneers whose names would be for ever linked with their times. The difficulties and dangers alike of travel and the lack of communication prevented anything but a narrow diffusion of the knowledge of current events.

Few people in the world to-day, with the knowledge contributed by broadcasting, by press and by post, can fail to be conscious of the fact that they are living in an historical period, the like of which the world has not yet seen. Because of that consciousness of their destiny each and every one must be held responsible for the part they will be called on to play in these next fateful years.

I believe that the more personal contacts are cultivated, the less is the danger of misunderstanding among men. Such contacts are now at hand with the increasing facilities for cheap and rapid travel.

I believe no less that it is to the air to which we must look for that world-wide ease of fast travel which alone will enable the peoples of the world to get together.

And it is with the air and its many problems that the Royal Aeronautical Society is so closely concerned.

Eighty years ago six men met to form this Society, the object of which was, ultimately, to discover that means of swift travel by which world-wide personal contacts could be made. For half of those years, only the spirit of its belief in its inevitable success kept the Society alive.

It was only thirty-six years ago that the first member of the Society flew in a power-driven machine. During those thirty-odd years the fire of inspiration of the aircraft pioneers burned brightly. The pioneers were few and the reapers of what they have sown have been many.

A MESSAGE FROM THE PRESIDENT

There is always the danger that the spirit of progress may be lost in the desire for immediate material gain, and it is a danger against which this great Society must always be on its guard.

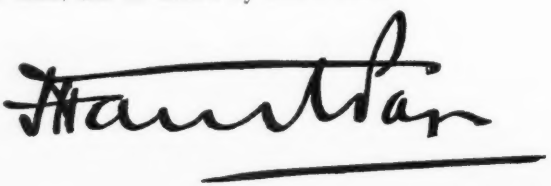
The long history of the Royal Aeronautical Society has not failed to show that pioneering spirit of progress which has made its name honoured throughout the world. I cannot emphasize too strongly the hope that during the next 80 years the Society will not lose that spirit which comes from striving towards that perfection which ever eludes one in realization. The spirit of the Society, its progress and its reputation, depend—as do those of a nation—on its individual members.

It is a well-established engineering maxim that you cannot get more work out of a machine than you put into it. Members owe as much to the Society as it does to them. The spirit of its members is not measured by the material gain they get from their subscription, nor is the power of the Society to be measured by the count of its members.

I am not going to refer here to the history of the Society in detail. That history has recently been written, and I hope that every member will obtain a copy and gain from it that inspiration which will enable them to make the history of the next eighty years worth the writing. The members of the Society, indeed, are now writing the very first page of the history of the Air Age. And every member cannot help being concerned with what will appear upon that page.

There is much to be done by us all in the next few years, and the goodwill, knowledge, and experience of all members must be called upon. Only by every member working in the spirit which has made the Society great, will it go forward and retain that authority of which it may well be proud.

In the words of Carlyle, " Properly thou hast no other knowledge but what thou hast got by working; the rest is yet all a hypothesis of knowledge; a thing to be argued in all schools, a thing floating in the clouds, in endless logic-vortices, till we try it and fix it. Doubt, of whatever kind, can be ended by action alone."



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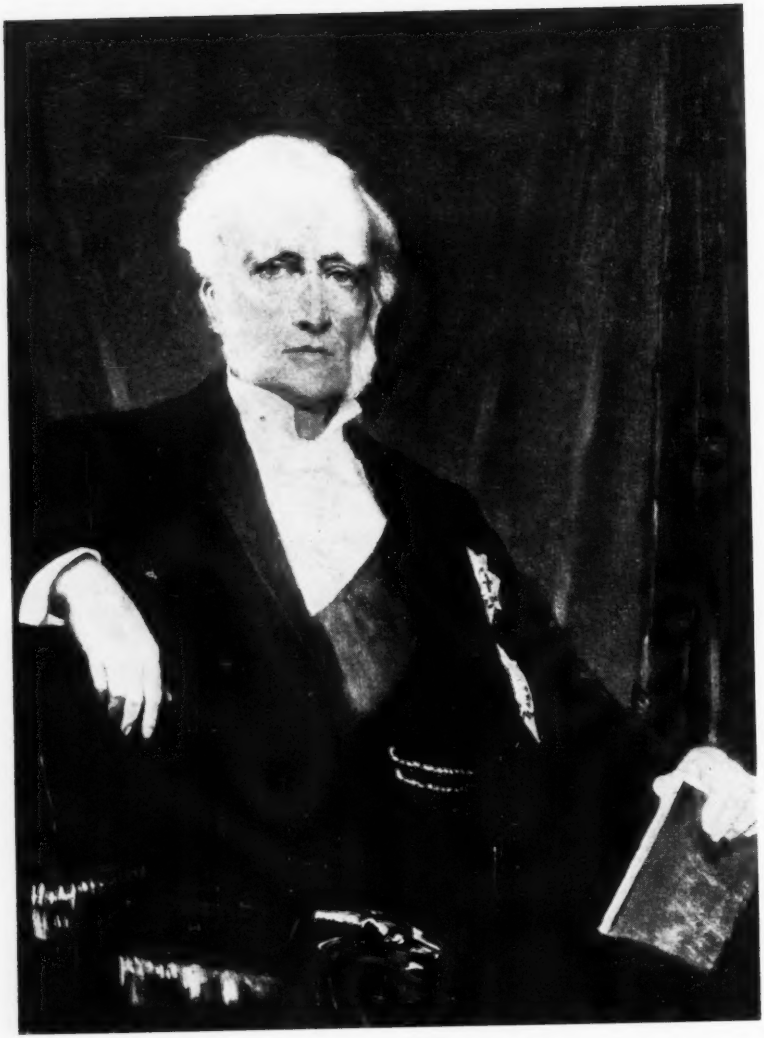


THE DUKE OF ARGYLL, K.T.

First President of the Society

A CHRONOLOGY

of the

ROYAL AERONAUTICAL SOCIETY

1866 to 1946

1866 January 12th, the Royal Aeronautical Society founded as the Aeronautical Society of Great Britain.

The first public meeting held on June 27th at the Society of Arts, at which Wenham read his classic paper "Aerial Locomotion and the Laws by which Heavy Bodies Impelled through Air are Sustained."

1867 Green exhibited before the Society a model of a balloon intended to fly the Atlantic.

During a discussion on April 17th on experiments with screws for helicopters, Wenham considered it to be utterly valueless and a waste of time. He made the following comments: "A screw is in all respects perfect as a propeller for aerial machines; but its effectiveness for this purpose depends upon the condition that the screw must work through the air at a speed nearly equalling that due to its pitch or the angles at which the blades are set. . . . As regards double or superposed screws with motion in opposite directions, the under screw to be effective at all must have its pitch greater than that of the upper screw."

1868 First Aeronautical Exhibition held by the Society at the Crystal Palace on June 25th. There were 77 exhibits, including Stringfellow's model triplane and prize-winning steam engine, the lightest engine for its power/weight ratio yet made.

1869 The first mention of the possible use of aluminium in aircraft made by D. S. Brown at a meeting held on July 14th.

1870 Systematic series of experiments by the Society on lift and drag of inclined planes begun under the direction of F. H. Wenham. The first experiment to be made by the Society in a primitive wind tunnel, the first wind tunnel experiments in the world.

1871 Results of the above experiments published in the Annual Report of the Society. Also, an account of experiments made in January 1846 by J. Spiller to ascertain the law of resistance to the passage of air through pipes of different diameters and lengths, at various speeds.

1872 Marey's "Lectures on the Phenomena of Flight in the Animal Kingdom" translated and published in the Annual Report.

The problem of the boundary layer was foreseen and the effect of aspect ratio at a meeting of the Society. Also, a new machine was exhibited for measuring the relation between the velocity and pressure of the wind. This had been constructed under the direction of the Society.

1873 Moy's steam engine demonstrated before the Society.

1874 Otto Lilienthal and Alphonse Penaud elected members.

1875 Moy's large model Aerial Steamer demonstrated before the Society at the Crystal Palace.

F. W. Brearey awarded the Gold Medal of the Société Francaise de Navigation Aerienne.

1876 Sir George Cayley's paper "Aerial Navigation" reprinted by the Society from "*Nicholson's Journal*" for 1809-10.

1877 Thomas Walker's "A Treatise on the Art of Flying" published by the Society—reprinted from the "Hull" edition of 1810.

1878 The Annual Report of the Society referred to a Club, the members of which were all Members of the Society, which met the Honorary Secretary monthly for discussions. The Club had suggested to the Society that a series of experiments should be made to decide that "instead of air being carried swiftly against the plane, the plane should be moved rapidly against the air, with mechanical arrangements to register the effect."

1879 The badge of the Society first used on the cover of the Annual Report.

1880 Major B. F. S. Baden-Powell elected a Member.

At a meeting on June 21st a paper was read by F. W. Brearey, "In Condemnation of Gas as an aid to Aerial Machines," in which he stated that: "The flying machine, if ever one worthy of the name be constructed, will be some apparatus of two dimensions."

1881 In a paper read before the Society on July 9th Douglas Scoffern drew attention to the rapid increase in the rate of resistance at high speeds; "e.g., at a speed exceeding 1,200 feet per second . . . the speed of sound in air is approximately 1,100 feet per second and it is now definitely known that as this speed is approached the resistance increases very rapidly."

1882 F. W. Brearey demonstrated his wave action aeroplane model.

At a meeting on July 17th a paper written by a New York member, Edward Serrell, was read and the Annual Report of the Society contained a paper sent in from Sydney, Australia.

1883 Death of John Stringfellow on December 13th.

1884 Horatio Phillips took out his patent No. 13,768 for curved surfaces.

At a meeting on July 2nd a Captain Thomas Griffiths read a paper entitled "A Light and Economical Motor for Propulsion in Air." The method proposed was to: "use gas on the jet system."

1885 Second Aeronautical Exhibition held by the Society at Alexandra Palace.

1886 A further paper read before the Society on " Jet Propulsion for Aeronautical Purposes " by Captain Griffiths, which began:—" The object of this Paper is to show that the engine-work between the prime mover and the work can be done away with."

1887 No meeting of Council was held this year. No Annual Report was published. The Reports were published annually between 1866 and 1882, then irregularly until 1893.

1888 D. Archibald read his paper before the Society on " Kite Balloons and Kite Tandems."

1889 Otto Lilienthal, a Member, published his famous work " Bird Flight " as a basis of aviation.

Sir Hiram Maxim took out his patent No. 1683 on " Aeronautic Apparatus."

1890 Octave Chanute elected a Member of the Society. The Accounts of the Society satisfactory for the first time in ten years.

1891 Sir Hiram Maxim elected a Member of the Society and gave an account of his whirling arm and other aeronautical experiments.

At a meeting held on November 27th Glaisher read a communication from Langley in America in which the latter drew attention to the value of high speeds for making the most economical use of a given power.

1892 Lawrence Hargrave experimented with cellular kites.

1893 Horatio Phillips tested his multiplane. At a meeting in June at which a report on the multiplane was given by F. W. Brearey, the chairman, James Glaisher said: " This was the first time in the Society's existence that they had been able to speak of an apparatus being in action for more than 600 feet and being off the ground most of the time. . . . This gave him a degree of hope he never had before."

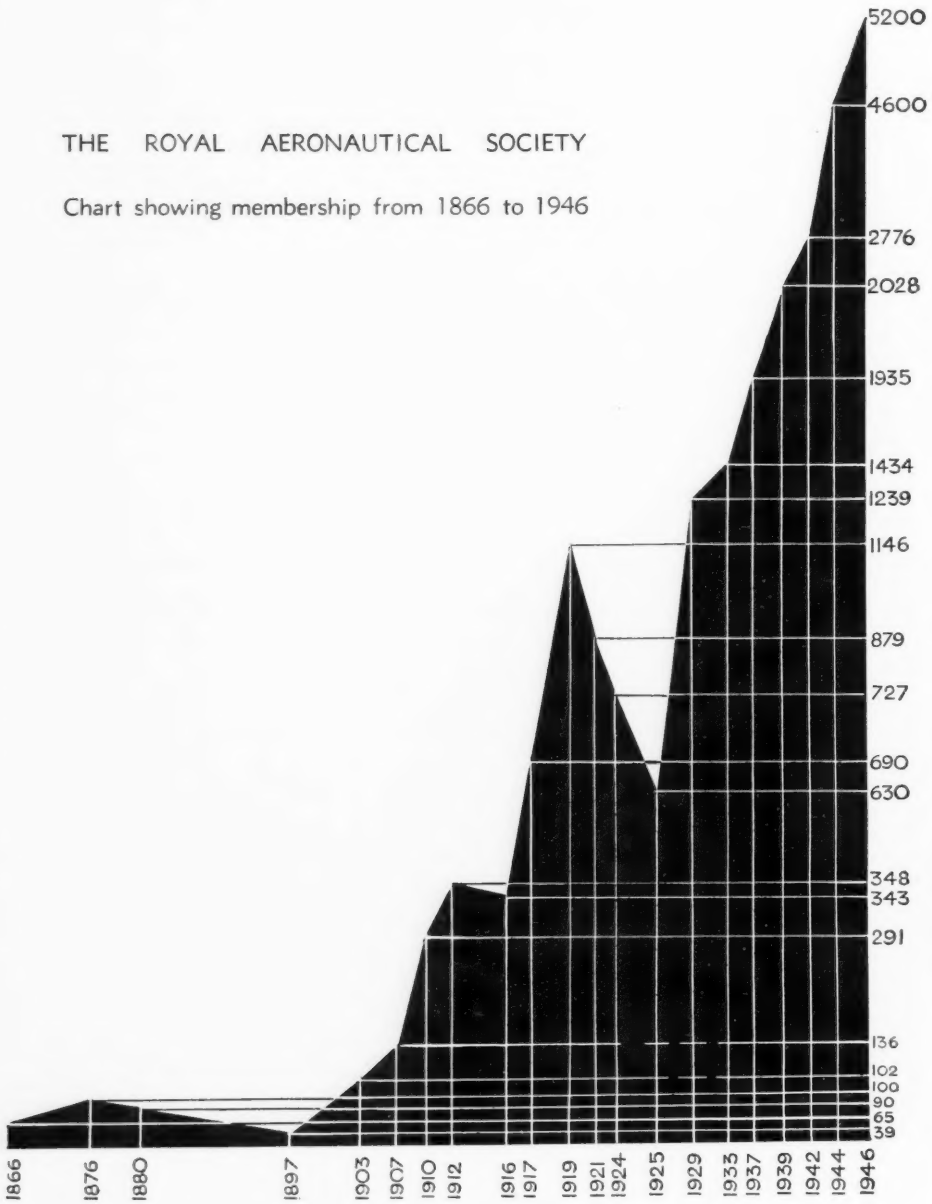
Papers read by Members of the Society before the International Conference on Aerial Navigation at Chicago.

1894 Sir Hiram Maxim's experiments on his large aeroplane showed that it was possible to raise considerable weights in the air, but that stability problems still remained to be solved.

1895 Percy S. Pilcher built his first glider.

1895 Deaths of Lilienthal and of F. W. Brearey, the first Secretary of the Society.

At a meeting of Council on November 30th, Council: " RESOLVED that the Honorary Secretary be authorized to purchase any books for a library of the Society." This was the beginning of what has now become one of the best aeronautical libraries in the world.


THE ROYAL AERONAUTICAL SOCIETY
Chart showing membership from 1866 to 1946
5200
4600
2776
2028
1935
1434
1239
1146
879
727
690
630
348
343
291
136
102
100
90
65
39
1866
1876
1880
1897
1903
1907
1910
1912
1916
1917
1919
1921
1924
1925
1929
1933
1937
1939
1942
1944
1946

1897 Lawrence Hargrave elected a Life Member.

Percy Pilcher elected a Member and, later in the year, a Member of Council.

The " Aeronautical Journal " published in January as a quarterly publication to succeed the Annual Reports of the Society. In the first number was published an account of the flight of Professor Langley's " Aerodrome " on May 6th, 1896.

1898 Sir William Crookes, Fellow of the Royal Society, elected a Member.

Women became eligible as full members for the first time.

1899 Lawrence Hargrave read his paper on " Box Kites " before the Society on May 26th.

Death of Percy Pilcher.

Brigadier General Sir H. O. Mance, the oldest member of the Society, elected a Member.

1900 F. H. Wenham contributed an important paper to the Journal on the " Forms of Surfaces Impelled through Air and their Effects on Sustained Weight."

The Pilcher collection of flying machines presented to the Society and exhibited at the Crystal Palace.

Papers read by Members of the Society at the Paris International Aeronautical Congress.

1901 Wilbur Wright contributed his first paper to the Journal—" Angle of Incidence."

Alexander Ogilvie, the second oldest Member, elected.

Pilcher's photographs, note-books, lantern slides and apparatus presented to the Society by his sister.

1902 The Society opened its first premises and Library at 53, Victoria Street, S.W.1, at an annual rent of £20.

Membership of the Society reached 100.

1903 Death of James Glaisher, one of the original founders of the Society.

Griffith Brewer, the third oldest Member, elected.

International Kite Competition organized in June by the Society at Worthing.

The first idea of a distinctive award—the Society's Silver Medal—instituted for the International Competition. It was not awarded because no competitor fulfilled the required conditions.

Library of the Society opened to Members on one day a month. A Librarian engaged at a salary of £6 a year.

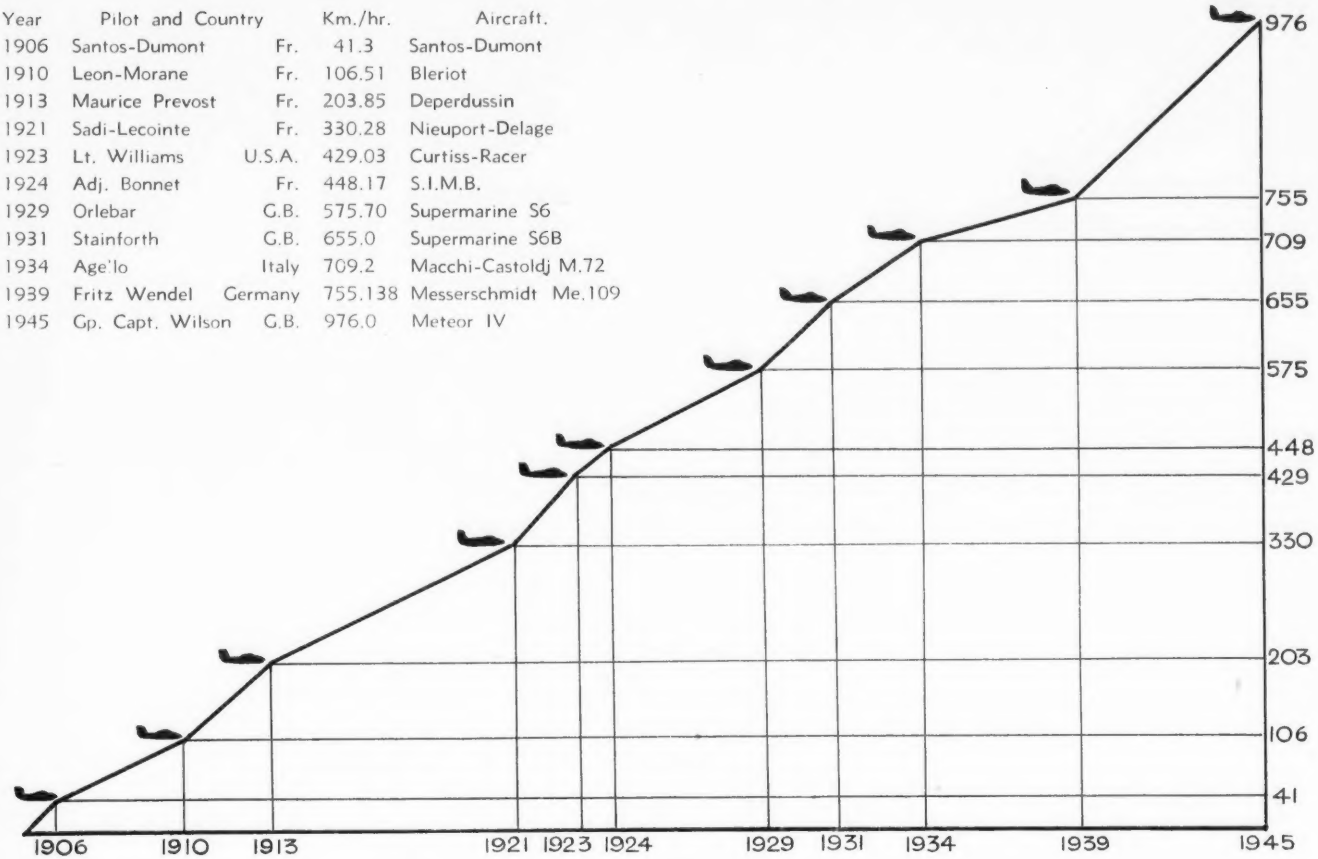
1904 The Experiments of the Brothers Wright published in the April Journal describing the first flight made on December 17th, 1903.

Professor G. H. Bryan read his first paper to the Society on Longitudinal Stability.

Several Members attended the Aeronautical Competitions and Conference at the St. Louis Exhibition.

THE WORLD'S AIR SPEED RECORD

Year	Pilot and Country		Km./hr.	Aircraft.
1906	Santos-Dumont	Fr.	41.3	Santos-Dumont
1910	Leon-Morane	Fr.	106.51	Bleriot
1913	Maurice Prevost	Fr.	203.85	Deperdussin
1921	Sadi-Lecointe	Fr.	330.28	Nieuport-Delage
1923	Lt. Williams	U.S.A.	429.03	Curtiss-Racer
1924	Adj. Bonnet	Fr.	448.17	S.I.M.B.
1929	Orlebar	G.B.	575.70	Supermarine S6
1931	Stainforth	G.B.	655.0	Supermarine S6B
1934	Age'lo	Italy	709.2	Macchi-Castoldj M.72
1939	Fritz Wendel	Germany	755.138	Messerschmidt Me.109
1945	Gp. Capt. Wilson	G.B.	976.0	Meteor IV



1905 A letter dated November 17th from Orville Wright, announcing flights up to 24 miles, read at a meeting of the Society on December 15th and published in the Journal of January 1906.

Baden Powell offered a prize of £10 for a flying model which was to weigh one pound and fly for at least 100 yards.

1906 Dr. Napier Shaw read his paper on the "Use of Kites in Meteorological Research."

The Society sent a loan collection of photographs, prints, diagrams and other objects of interest, for which it was awarded a Silver Medal, to the Aeronautical Section of the Milan Exhibition.

1907 A Kite Flying Display held on Chobham Common by the Society on July 1st.

F. Handley Page elected a Member.

1908 The Society's Gold Medal presented for the first time—to Wilbur and Orville Wright, for their "distinguished services to Aeronautical Science."

1909 The Society acquired an experimental ground at Dagenham, but it was abandoned not long after because of its inadequacy.

The Society exhibited photographs and prints and many Members showed models and exhibits at the Aero and Motor Boat Exhibition held at Olympia from March 19th to 27th. Of 31 machines shown 21 were of British construction.

The first aero-engine review published in the April Journal.

A special stand exhibited by the Society at the Travel, Sports and Pastimes Exhibition in July at Olympia.

Silver Medal of the Society awarded for the first time to S. F. Cody for "some advance in aeronautical design."

The Council issued a warning to the Public against investing money in aeronautical companies without first making thorough enquiries into such concerns.

1910 Octave Chanute awarded the Gold Medal of the Society "in recognition of distinguished service to the advancement of aeronautical science."

First Annual General Meeting held in January.

A table showing the first 21 aeroplane flights throughout the world—from October 17th, 1897 to December 31st, 1909—published in the January Journal.

1911 The Society reorganized, new rules passed and the grades of Fellow and Associate Fellow created. The Council elected for the first time by ballot.

Offices of the Society moved to new quarters at 11, Adam Street, Adelphi.

Preliminary report of the Technical Words Committee published in the January Journal.

The Society again exhibited at the Aero Show at Olympia.

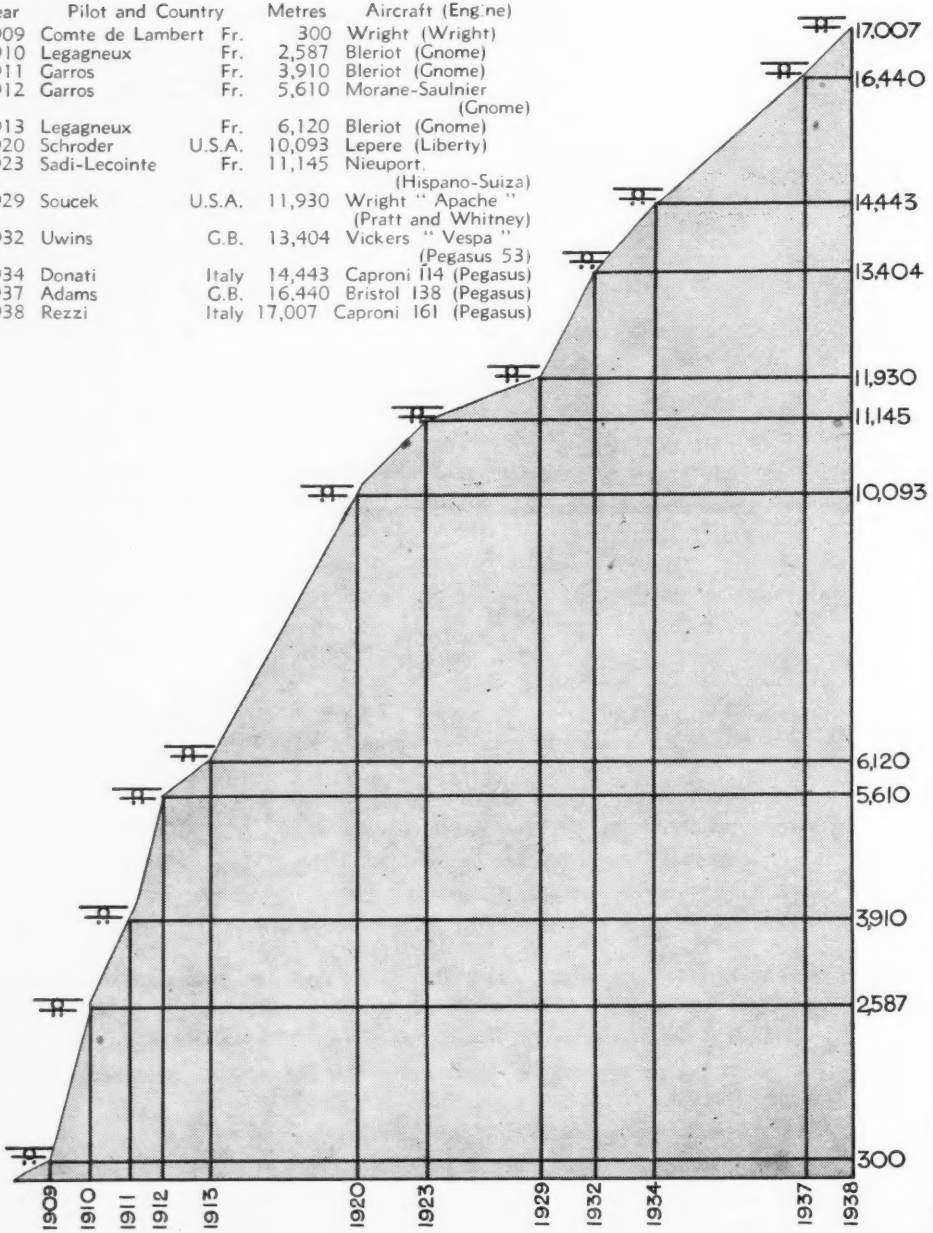
Aerial Science Limited formed to limit the liability of Members of the Society.

Informal meetings for discussion held every Monday evening at the offices of the Society.

THE WORLD'S AIRCRAFT ALTITUDE RECORD

Heights given in metres

Year	Pilot and Country	Metres	Aircraft (Engine)
1909	Comte de Lambert Fr.	300	Wright (Wright)
1910	Legagneux Fr.	2,587	Bleriot (Gnome)
1911	Garros Fr.	3,910	Bleriot (Gnome)
1912	Garros Fr.	5,610	Morane-Saulnier (Gnome)
1913	Legagneux Fr.	6,120	Bleriot (Gnome)
1920	Schroder U.S.A.	10,093	Lepere (Liberty)
1923	Sadi-Lecointe Fr.	11,145	Nieuport (Hispano-Suiza)
1929	Soucek U.S.A.	11,930	Wright " Apache " (Pratt and Whitney)
1932	Uwins G.B.	13,404	Vickers " Vespa " (Pegasus 53)
1934	Donati Italy	14,443	Caproni 114 (Pegasus)
1937	Adams G.B.	16,440	Bristol 138 (Pegasus)
1938	Rezzi Italy	17,007	Caproni 161 (Pegasus)



1912 Death of Wilbur Wright.

Pilcher Memorial Prize instituted—for Students. Awarded for the best paper of the year inaugurating discussion at the Students' Meetings.

1913 First Wilbur Wright Memorial Lecture read by Horace Darwin, M.A., F.R.S., on May 21st.

The first eight Fellows of the Society elected in October. Of these only two are still alive—J. W. Dunne and Alec Ogilvie.

1914 Professor G. H. Bryan, Sc.D., F.R.S., awarded the Gold Medal of the Society "for work on the mathematical theory of stability in aviation."

The Library reorganized.

All meetings of the Society, except the Wilbur Wright Memorial Lecture and the Annual General Meeting, cancelled on the outbreak of war.

Successful series of lectures organized by the Society in connection with the Aero and Marine Exhibition at Olympia between March 16th and 25th.

First list of terms issued to the Press by the Technical Terms Committee.

1915 Gold Medal of the Society awarded posthumously to E. T. Busk, killed on November 5th, 1914, "in recognition of distinguished services to aeronautical science."

Total membership of the Society at the beginning of the year was 350.

1916 Death of Sir Hiram Maxim, for many years a Member of Council.

Joint Standing Committee of Relations for the general benefit of aeronautical development formed by the Society and the S.B.A.C.

1917 Agreement signed with the Society of British Aircraft Constructors defining the functions of the two bodies. Offices of the Society moved to 7, Albemarle Street, W.1.

A combined occasion held for the first time by the Aeronautical Society, the Royal Aero Club and the Society of British Aircraft Constructors—an "At Home" at the Aircraft Exhibition at the Grosvenor Galleries on March 25th.

A Juvenile Lecture given for the first time for children of Members and their friends—"The Aeroplane," by Dr. A. P. Thurston.

Courses of Educational Lectures given at principal centres of the aircraft industry throughout the country.

1918 Distinction of the title "Royal" granted to the Society.

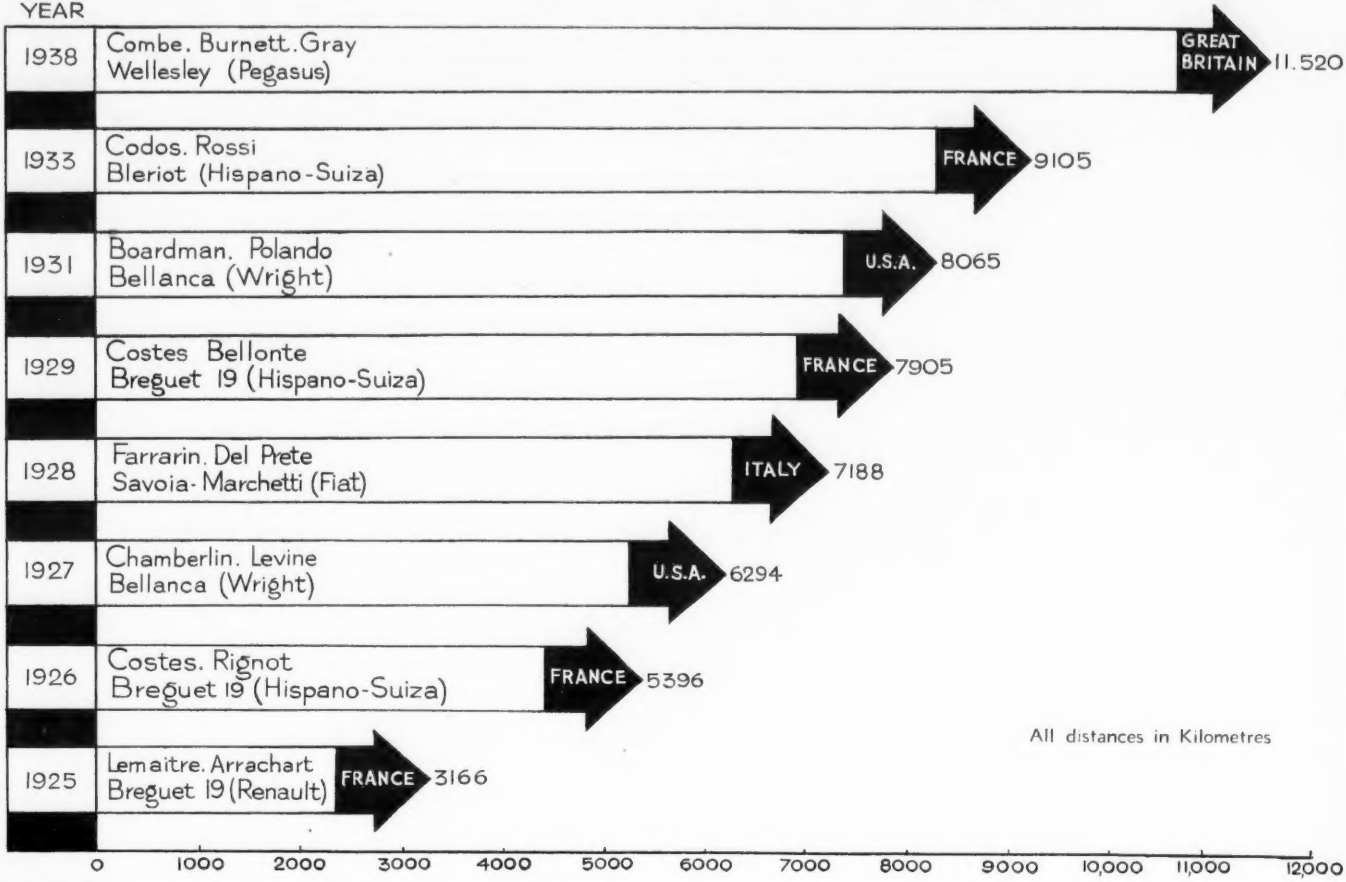
The Journal issued monthly, instead of quarterly, as from January.

Abstracts from the Technical Press published for the first time in the April Journal.

Number of Council increased from 16 to 20.

The Society undertook the allocation of the Exhibition of Enemy Aircraft which had been held at the Agricultural Hall, Islington.

THE WORLD'S DISTANCE RECORD (Without Refueling)



1919 "Glossary of Aeronautical Terms" published by the Society. First Garden Party held by the Society, at Cricklewood.

First number of "Transactions of the Royal Aeronautical Society" published —"Calculations of Stresses in Aeroplane Wing Spars," by Arthur Barry, M.A.

H.R.H. the Prince of Wales became Patron of the Society.

Branch of the Society formed at Glasgow.

Membership of the Society exceeded 1,000.

1920 H.R.H. The Duke of York (now H.M. George VI) presided at the Wilbur Wright Memorial Lecture.

Annual Dinner revived.

Cambridge University Aeronautical Society became affiliated to the Society.

For a short time meetings were held in the afternoon instead of evening, and the practice of having more than one paper was temporarily adopted.

1921 Examinations instituted for Associate Fellowship.

The custom of awarding medals for the best Papers was revived.

A series of monthly Students' Discussion Meetings instituted in the Library of the Society, organized and managed by the Students.

A Safety and Economy Committee appointed by the Council to discuss the type of engine and the mechanical arrangements required for safe and economical working of an aeroplane on the London-Paris air route.

1922 R.38 Memorial Prize founded, for the best paper received annually on some subject of a technical nature in the science of aeronautics, preferably relating to airships.

First examinations for Associate Fellowship held in the Library, on September 25th and 26th.

1923 International Air Congress organized by the Society.

Title of the Journal changed in January to "Journal of the Royal Aeronautical Society."

A Grant of £500 from the Carnegie United Kingdom Trustees enabled a number of valuable books to be added to the Library.

1924 Busk Memorial Prize founded, for the best paper received annually on some subject of a technical nature in connection with aeroplanes, including seaplanes.

1925 R.38 Memorial Tablet unveiled in the Library of the Society by the American Ambassador.

Grants of £250 a year, for at least five years, made to the Society by the Air Ministry and the Society of British Aircraft Constructors.

Second Branch of the Society formed—at Coventry.

The sum of £5,000 granted by the Daniel Guggenheim Fund for furtherance of the objects of the Society.

Balance sheet of the Society showed an excess of income over expenditure for the first time since the Great War.

A new technical grade of Associate created.

1926 First appeal made for an Endowment Fund. Between 1926 and 1945 this Fund rose to more than £100,000.

Gold Medal of the Society awarded to Dr. Lanchester " in recognition of valuable services rendered to the science of aeronautics."

Sixtieth anniversary celebrated by a conversazione at the Science Museum.

Scottish Branch of the Society wound up under new rules created for Branches.

Elliott Memorial Prize founded annually, for papers received from R.A.F. Apprentices at Halton.

1927 The Society and the Institution of Aeronautical Engineers (formed in 1919) amalgamated.

Gold Medal of the Society awarded to Professor Prandtl " in recognition of immense contributions to the science of aeronautics."

First six Data Sheets of the Society issued.

Title of Member of the Society changed to that of Companion, and two new grades created—Members and Associate Members.

Catalogue of the books and periodicals of the Library published for the first time. Also, a consolidated Subject Index of the Journal for 1897 to 1926.

1928 Aeronautical Trusts Limited formed to deal with the Trust Funds of the Society.

Dinner held by the Society at the Science Museum, under the original Wright machine, to commemorate the first flight on December 17th, 1903.

Delegates from the Society attended the International Civil Aeronautics Conference at Washington.

Society showed historical exhibit at the International Aeronautical Exhibition at Berlin.

1929 A prominent part taken by the Society in the Aeronautical Exhibition at Olympia. The Society showed a unique collection of historical works, papers and prints.

1930 Many leading members of the Society killed in the R.101 disaster.

The Secretary visited America and advised on the formation of an American Aeronautical Society, now the Institute of Aeronautical Sciences, modelled on the Royal Aeronautical Society.

1931 Lectures to Public Schools inaugurated by the Society.

Paper entitled " Jet Propulsion for Aircraft " by E. G. Richardson published in the January Journal, and a comment by Flying Officer F. Whittle published in the March Journal.

1932 Miss Amelia Earheart present at the Council Dinner following the Wilbur Wright Memorial Lecture—the only woman to be invited to this annual dinner.

1933 National Diplomas and Certificates in Aircraft Engineering endorsed by the Society.

Gold Medal of the Society awarded to Sir Richard Glazebrook " for work as Chairman of the Aeronautical Research Committee since its formation in 1909."

1934 British Gold and Silver Medals for Aeronautics founded, " for an outstanding achievement leading to advancement in aeronautical science."

1935 Society Membership reached 1,500 for the first time.

The First Annual Garden Party.

1936 Another drive made to increase the Endowment Fund, in connection with the Seventieth Anniversary of the Society.

1937 His Majesty the King became Patron of the Society in March.

Gold Medal of the Society awarded posthumously to Senor Juan de la Cierva " in recognition of his remarkable achievements "—with his Autogiro.

1938 Baden-Powell Memorial Prize instituted in memory of Major B. F. S. Baden-Powell, who died in October 1937. Awarded twice yearly to the best Student in the Society's Association Fellowship Examinations.

Membership of the Society reached 2,000 with some 5,000 additional members in many branches throughout the country.

1939 Offices of the Society moved to 4, Hamilton Place with a formal two-day opening in June, attended by some 2,000 members and their friends.

More than 6,000 members and guests attended the Annual Garden Party, at Hayes, on May 14th, which was the largest since this function was started.

On the outbreak of war the archives and valuable books and papers of the Society were moved to Brockham for safe-keeping.

Lecture programme cancelled except for the Wilbur Wright Memorial Lecture.

Through the efforts of the Society, the University of London agreed to the creation of an aeronautical engineering degree.

1940 Stressed Skin Committee appointed by Council. More than 100 meetings held during next four years.

The data sheets of this Committee highly praised by the Industry in Great Britain, Canada, the U.S.A. and Australia.

Membership and Associate Membership grades abolished and amalgamated with the Fellowship and Associate Fellowship grades.

On two occasions bombs dropped nearby caused damage to the headquarters of the Society.

Sum of £5,000 bequeathed to the Society by Stanley Spooner, Founder Member, to be devoted to the foundation of the Stanley Spooner Scholarship for aeronautical research. The legacy does not become payable until the death of two life tenants of the amount.

No awards or medals made for the year except the Elliott and Baden-Powell Memorial Prizes.

1941 Six secret meetings held at week-ends on subjects of importance to the war effort, which were attended by representatives from all R.A.F. Commands, the Fleet Air Arm and the Industry. Producers and users brought into direct contact for the first time.

Number of Branches and The Students' and Graduates' Section revived their activities.

DETROIT PUBLIC LIBRARY

Further damage done to the headquarters of the Society by bombs dropped nearby.

Meetings held from time to time, on Sunday afternoons.

1942 Three more secret meetings held between the Services and the Industry.

New rules passed governing the grade of Fellow.

Reduction in subscription to the Journal made to members who generously gave up the Journal during the war so as to conserve paper.

Aerodynamics Data Sheets Committee formed and held 54 meetings up to the end of 1944. Data Sheets of this Committee also proved of great value to the Industry at home and in Canada, Australia and the U.S.A.

1943 Membership increased by 800.

Endowment Fund reached a total of £103,071.

Discussions held on the Education and Training of Aeronautical Engineers, following which resolutions forwarded to the Ministry of Labour, the Ministry of Aircraft Production, the Air Ministry and the Board of Education.

Branch Prize founded—awarded by the Council for the best paper read before the Branches.

A collection of over 300 aeronautical medals, dating 1714 to 1941, acquired by the Society.

Dr. E. P. Warner (U.S.A.) elected an Honorary Fellow, the 18th person to be so honoured by the Society in 78 years.

1944 Gold Medal of the Society awarded to Air Commodore F. Whittle, C.B.E., B.A., F.R.Ae.S., for his work on jet propulsion.

Annual sum of £250 set aside by Council for payment of premium awards to authors of papers published in the Journal.

Arrangements made for examinations of the Society to be held in Prisoner-of-War Camps, on board ship and at Royal Air Force stations.

Winston S. Churchill elected an Honorary Fellow on his seventieth birthday.

1945 Gold Medal of the Society awarded to Professor L. Bairstow.

Bomb damage to the Society's headquarters for the seventh time.

Open Sessions and Lectures of the Society resumed.

Format of the Journal altered.

1946 Eightieth Anniversary of the Founding of the Society, celebrated by a dinner at the Guildhall and a reception at Hamilton Place. At this time there were some 5,000 members of the Society and 24 Branches. Since 1866 a total of 684 lectures on aviation had been read, and between 1866 and 1946 there had been 559 meetings of Council.

THE ROYAL AERONAUTICAL SOCIETY

With which is incorporated The Institution of Aeronautical Engineers

COUNCIL

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Mr. A. GOUGE, B.Sc., F.R.Ae.S.

Mr. GRIFFITH BREWER, Hon. F.R.Ae.S.

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Below are listed the various Committees of Council as now constituted.

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Mr. R. T. Youngman
Mr. H. F. Vessey
Mr. A. D. Young
Mr. R. M. Clarkson

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Mr. E. J. Archbold
Mr. A. E. Russell
Mr. J. L. Batchelor
Mr. G. E. Petty

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Dr. H. Roxbee-Cox
Mr. W. S. Farren
Professor F. T. Hill
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Air Commodore A. H. Robson

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Air Commodore Helmore
Mr. B. N. Wallis
Mr. W. E. W. Petter
Major C. J. Stewart
Mr. F. M. Owner

Lecture Hall Committee
Professor L. Bairstow
Major B. W. Shilson

Lecture Hall Committee (*continued*)
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Mr. W. C. Devereux
Mr. A. Gouge
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Dr. B. Chalmers
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Mr. A. Gouge (*Chairman*)
Professor G. T. R. Hill
Sir Roy Fedden
Mr. W. S. Farren
Mr. W. G. A. Perring
Major C. J. Stewart
Dr. A. G. Pugsley

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Mr. R. K. Pierson
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Mr. A. C. Clinton
Captain J. G. Hopcraft
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Mr. N. E. Rowe
Mr. A. Gouge
Dr. H. Roxbee-Cox
Dr. L. Aitcheson
Captain Luby
Mr. H. B. Irving

AUSTRALIA IN EMPIRE AIR TRANSPORT

by

W. Hudson Fysh, D.F.C.

A MEETING of the Society was held in the Lecture Hall of the Institution of Electrical Engineers, Savoy Hill, London, W.C.2, on Tuesday, 13th November, 1945, at which the first British Commonwealth and Empire Lecture, entitled "Australia in Empire Air Transport," was given by Mr. W. Hudson Fysh, D.F.C., Managing Director of Qantas Empire Airways. In the chair, the President, Sir Frederick Handley Page.

The CHAIRMAN: The Society were meeting on a memorable occasion—the first British Commonwealth and Empire Lecture. It was some forty odd years since man first flew, when the two Wright brothers launched their biplane and solved the problem of power-driven flight. The Society commemorated that which was the beginning of man in flight in their principal lecture, the Wilbur Wright lecture.

It was fitting that following on that they should have a lecture called "The British Commonwealth and Empire Lecture," because if there was one means of transport and communication by which our fellow citizens across the seas could communicate with this country, it was by air. Therefore, in having as their second principal lecture the British Commonwealth and Empire Lecture, the Society were adding appropriately to their series. They were fortunate in that the first lecture was to be delivered by Mr. W. Hudson Fysh.

Mr. Fysh joined the R.F.C. as an observer in No. 67 Squadron (which later became No. 1 Australian Squadron) in 1918. Later that year he obtained his pilot's wings. Repatriated to Australia, he was chosen by the Australian Government, with Mr. P. J. McGinnis, to survey and lay out a route across Northern Australia for the competitors in the £10,000 prize England to Australia flight. Later this route became the highway across Australia for air traffic to and from England.

While in Queensland Mr. Fysh was instrumental in forming, with Mr. (later Sir) Fergus McMaster and Mr. McGinnis, Queensland and Northern Territories Aerial Services, Ltd., which operated taxi flights. Hudson Fysh was Chief Pilot and Director and Mr. McMaster was the Chairman of the Company. On the 2nd November, 1922, they received a government contract to operate a regular air route from Sullivan to Cloncurry. This was the second air route to be operated in Australia. Mr. Fysh had done no regular flying after 1932.

AUSTRALIA IN EMPIRE AIR TRANSPORT

Qantas Empire Airways was formed in 1934 when Queensland and Northern Territories Aerial Services, Ltd., joined up with Imperial Airways, Ltd., and took over the Singapore-Brisbane section of the Empire route to Australia.

INTRODUCTION

It is a great honour to have been asked by The Royal Aeronautical Society to give the foundation British Commonwealth and Empire Lecture, and I have accepted, having in mind the Australian pioneers of the air from whose past has sprung the beginning of our Australian part in the common effort of to-day.

I would like to congratulate the Society on founding this lecture, which it takes little prediction to forecast will grow into one of the most important annual aviation events in the Empire—as well as facilitating the assembling together in the Journal of information, opinion and suggestion from the four corners of the Empire. This, in itself, is only made possible by air travel, and as an illustration of what can be done, you should know that this is my third visit to this country from Australia in this year of 1945.

Our distance in Australia from the once far-away Homeland is fast disappearing, and we feel more than ever in our outlook and future hopes that we are at one with the people of the United Kingdom and of other parts of the Empire.

However, I am not by any means addressing myself only to the United Kingdom, but also to the Dominions and Colonies. In regard to this I am reminded of what I heard Sir Ernest MacMillan, the famous Canadian musician, say recently, in the course of a Rotary Club address in Sydney. He said, "The war has drawn the Dominions closer together. We were each of us like one of a family who wrote home to Mother regularly but who were bad correspondents between themselves—this is altered now."

You may, perhaps, not find this lecture as technical as some of you would have liked. Nevertheless, I hope you will find it practical and historical in a way which will enable at least some few conclusions worthy of thought by us all to be reached. Also, that it will assist in providing a certain amount of background for lectures to come, some of which it is hoped will be of a technical nature in prescribing aircraft for use on the future Empire routes.

We, in the Dominions, can vie with the Old Country in operating efficiency, in the new and young enthusiasms, and that "getting on with the job" attitude which we demand in peace as in war; but we must instinctively turn to you here, and your accumulated learning and technique of the past, to advise us and—more than that—supply us with the best and latest your aircraft engineering brains can produce in graceful, pleasing air transports fully competitive with the world's best.

This lecture, therefore, has no technical propensities, but after touching lightly on the antiquity of transport and its historical foundations in the British Isles, will take you out by sailing ship with the pioneers to Australia and from there pass on, through our pioneering history in the air, to the actual position in Empire Air Transport in which we find ourselves to-day.

What I want to bring out is how—while the United Kingdom was designing and trying out—we in the Dominions and Colonies were hacking out the Air Routes and starting to operate and test out your products.

EARLY COMMUNICATIONS—SEA, LAND AND AIR

It is through His Majesty's Mails that I want to trace this great historic movement of communications.

Mails, air mails, are means of communication and there is, perhaps, no more romantic story than the history of com-

munications because the progress of the human race from the time of its emergence from primitive savagery is linked with the advance of transport.

In the animal kingdom the most common communication takes the form of transmission of danger signals and challenges—shoutings from tree top to tree top; the beating of hairy arms on a gorilla's chest; the stamping of a rabbit's foot; or a kangaroo's tail thumping on the ground. No doubt our primitive ancestors went forward from such elementary stages to messages by word of mouth—by language, and to the earliest type of man-made aids, such as the drums of Africa, and the smoke fires and message sticks of the Australian Aborigines.

Passing on to the days of ancient history we find that messages were sent by special messenger, or arrangements made with travellers and merchants to convey letters. These letters were written on clay tablets, parchment, or papyrus, as the age dictated, and many curious clay letters still exist as museum pieces.

The use of Carrier Pigeons was also known to the ancients and their employment was reported in the times of the Pharaohs. Pliny relates that Brutus used them in 43 B.C. for military purposes at the siege of Modena.

The earliest record of organized communications is said to be that of the ancient Persians who employed relays of men and horses for carrying missives. Later the Romans employed a similar method.

This brings us up to the time of early English history. The following comment is found in " Stage-coach and mail in days of yore."

> " Long before wheeled conveyances of any kind were to be hired in this country (England), travellers were accustomed to ride post. To do so argued no connection with that great Department we now call the Post Office, although that letter-carrying agency and the custom of riding post obtain their name from a common origin. The earliest provision for travelling post seems to have been in the reign of Henry VIII, when the office of ' Master of the Postes ' was established. Sir Brian Tuke then held that appointment, and to him were entrusted the arrangements for securing relays of horses on the four great post roads then recognised: the road from London to Dover, on which the carriers came from and went to foreign parts; the road to Plymouth, where the King's dockyard was situated; and the great roads to Scotland and Chester, and on to Conway and Holyhead. These relays of horses were established exclusively for the use of despatch riders who went on affairs of State; but by the time of Elizabeth these messengers were, as a favour, already accustomed to carry any letters that might be given into their charge and could be delivered without going out of their way."

The Post Office as an institution for carrying the correspondence of the public may be said to have come into existence in 1635 when the office of " Master of the Postes " was created. In 1657, the " Post Office of England " was established by Act of Parliament and the office of Postmaster General created in succession to that of " Master of the Postes." By this time the stage coach had commenced to take over from the horseman as a mail carrier.

For 200 years the mail coach was in charge in England till about 1840, when railway transport was introduced on the trunk lines. The average speed of the mail coaches was from seven to eight miles per hour, 10 miles per hour being the fastest. Little or no advancement in speed seems to have been made during their reign of two centuries, despite the pressure of the public for increased speed and better roads. The London to Edinburgh mail coach was scheduled to cover its 399-mile journey in 42 hours 23 minutes.

The year 1840 marked the introduction of Rowland Hill's penny post (1d. per ½ oz.)—an epoch-making event in the history of the

Post Office. This year also marked the issue in England of the World's first postage stamps—they were the famous original 1d. and 2d. British. Prior to the introduction of the penny post, which was only obtained at the cost of great opposition, letter carriage was charged by distance. For example, it cost 8d. to send a letter from London to Cambridge, and 1/- from London to Durham.

A paragraph from " Stage-coach and mail in days of yore " illustrates the passing of the old and introduction of the new:—

> " Pathetic were the circumstances attendant on the disaster which overtook the Lark Leicester and Nottingham Stage on May 23rd, 1840. The coach was on its last journey when it occurred, for the morrow was to witness the opening of the railway between the two places. Like most of these last trips, the occasion was marked by much circumstance. Crowds assembled to witness the old order of things visibly pass away, and Frisby, the coachman, had dolefully tied black ribbons round his whipstick, to mark the solemnity of the event. Unfortunately, that badge of mourning proved in a little while to be only too appropriate, for the well-loaded coach had only gone about a mile and a half beyond Loughborough when Frisby, who had been driving recklessly all the way, and had several times been remonstrated with, overturned it at Coate's Hill. A Mr. Pearson and another were killed."

The most notable events up to the end of the century were the transference of the mails from coach to rail and from sail to steam, a great acceleration of delivery where distance was a factor realized in both instances.

Before dealing with the introduction of air mails, the most interesting and significant happening of note was the use made of balloons by the French during the Franco-Prussian war in 1870-71.

During the siege of Paris the only means of communication with the outside world was by balloons and pigeons. In all, 66 balloons left Paris carrying 66 aeronauts, 102 passengers, 409 carrier pigeons, nine tons of letters and telegrams, as well as six dogs. Fifty-nine balloons did their work as arranged, five fell into the hands of the enemy, and two disappeared altogether.

For the return trip into Paris 57 carrier pigeons were all that reached the besieged city, and they carried 100,000 messages. Microscopic photography was successfully used to reduce the size and weight of the messages carried by the birds. By this means sixteen folio pages of print (32,000 words) were reduced to a pellicule 2 inches long.

The Paris balloon post was the first carriage of mails by air in history and a specimen should be placed first in any Air Mail collection.

From Stringfellow and Henson and Maxim, we go to the German glider experiments, and then to the first power-driven aeroplane flight which occurred on December 17th, 1903, at Kitty Hawk, North Carolina. This was the famous Wright Brothers biplane.

As the safety, speed and reliability of aircraft advanced rapidly, attention was seriously turned to the aeroplane as a fast and convenient mode of transportation, epoch-making in its ability to fly over land and mountain, and to cross the seas.

Up to and during the world war 1914-1918, a number of experimental mail carrying and " stunt " flights were made, but few, if any, had much practical value except to point the way to the future and obtain public interest. The best known events were the Coronation Flights between London and Windsor, organized by Sir W. Windham. Special covers, cards, and postmarks were employed on these flights, which were made between the 9th and 16th September, 1911.

Another interesting experimental flight was that made in India at the end of February, 1911, when Captain Windham and Mon-

sieur Pequet in a Humber biplane successfully inaugurated the world's first official air mail service by conveying letters from the grounds of the exhibition at Allahabad, to the receiving post office at Naini across the Jumna River. Over 5,000 letters were carried in one day on the Humber machine.

During the war aircraft were used extensively for the carriage of messages and despatches, such flights being of the greatest value.

In 1919 immediately after the war, regular air mail services were commenced and advancement has been rapid up to the present day. Now services are operating to practically all parts of the world and both the Atlantic and Pacific Oceans have been bridged.

Two most significant British pioneering flights were successfully undertaken in 1919—one from Newfoundland to Ireland by Sir John Alcock and Sir Arthur Whitten Brown, the other from England to Australia by Sir Ross Smith and Sir Keith Smith. Both flights traversed for the first time routes destined to become great air highways of the future.

Though later in the field than Alcock, Whitten Brown and the Smith brothers, the late Sir Charles Kingsford Smith probably contributed more than any other single man by blazing new air trails over long distances.

After giving you this short background of progress in general, I want to approach the Australian side.

In this year of 1945, air services cover Australia in a network serving the main centres of population, with an Overseas service connecting with B.O.A.C. at Karachi and a service from Sydney to New Guinea. There is also a joint United Kingdom-New Zealand-Australia service in Tasman Empire Airways connecting the two Dominions.

What events have led up to the establishment of these Services, and what changes have they wrought in service to the public by provision of speedier communications?

In the early days of Australian colonization, mails were carried much in the same way as we have described in the early nineteenth century in England. The English reforms of 1830-40 were speedily followed up in Australia, New South Wales issuing her first postage stamp in 1850, followed by Victoria and Tasmania two years later. Rail transport, and, of course, coaches were much in evidence.

The most famous coach transport organization was Cobb and Co., whose activities have become immortalized by Henry Lawson, the Australian poet, in " The Lights of Cobb and Co." from which the following is quoted:—

" The roaring camps of Gulgong and
many a ' Diggers Rest ';
The diggers on the Lachlan; the huts of
Farthest West;
Some twenty thousand exiles who sailed
for weal or woe . . .
The bravest hearts of twenty lands will
wait for Cobb and Co."

The early days of overseas mail services are bound up with the history of the old days of sail, and we read the following comment in " The Colonial Clippers ":—

" I do not think anything shows the enterprize of the Black Ball and White Star Lines more clearly than the contracts which they signed in 1855 with Earl Canning, the Postmaster General, for the carriage of mails to Australia. Messrs. Pilkington and Wilson undertook to carry the mails in the following ships, Ben Nevis, Shalimar, Red Jacket, Emma, Fitzjames, Mermaid and White Star; and to land them in Australia in 68 days, or pay a penalty of £100 a day for every day over that time. James Banes was even more daring, for he accepted a contract to land the mails in 65 days, with the same penalty attached."

The record does not say at what point the mails had to be landed in Australia. If it severe, because the average time between

was Melbourne penalties must have been English ports and Melbourne for the fastest ships was from 70 to 90 days and some exceeded 100 days.

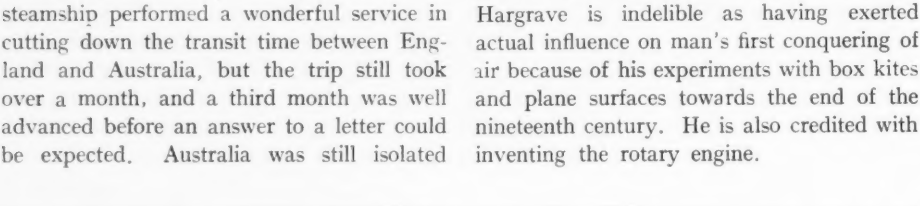
Little or no speeding up occurred till the introduction of steam. This culminated in the London-Melbourne journey being run to a schedule of 30 days in the early part of the twentieth century. Thus the modern steamship performed a wonderful service in cutting down the transit time between England and Australia, but the trip still took over a month, and a third month was well advanced before an answer to a letter could be expected. Australia was still isolated and far distant from the great cultural and industrial centres of Europe and America.

Australia, as a young country, was somewhat handicapped in comparison with older lands in building up transport systems and industrial enterprises, which had in instances already been in existence for hundreds of years. Australia needs must import not only the stock in trade but the experience.

Aviation, a young and intensely modern development, came as the country was finding its feet as a result of Federation and participation in the World War. Australia approached the new art of Aviation with the feeling that she could enter into a great new world movement on a footing of equality with the World.

Australia with its great distances and scattered population lent itself to air exploitation. The handicaps were a small population and consequent want of wealth, the cost of exploitation per head being high because of the great distances often involved in serving small centres of population.

In exploring the actual birth of Flying in Australia, we find that the name of Lawrence Hargrave is indelible as having exerted actual influence on man's first conquering of air because of his experiments with box kites and plane surfaces towards the end of the nineteenth century. He is also credited with inventing the rotary engine.



A Hargrave flying model of 1891, which flew a distance of 128 feet in eight seconds.

What is generally recognized as the first aeroplane flight in Australia was made by Harry Houdini, the world-famous American escapologist, at Digger's Rest, Victoria, on 18th March, 1910, with a Voisin biplane. On his third flight of the day, which lasted 3½ minutes, about two miles were covered and a height of 100 feet attained.

Another flight of interest in the same year was that of J. L. Duigan, who built his own aeroplane and actually flew it for 196 yards. This was the first flight by an Australian in an Australian-built aeroplane—the date was 7th October, 1910.

Other pioneers who were prominent in making flights in Australia before the last war were M. Guillaux, "Wizard" Stone,

Basil Watson, W. E. Hart, Harry Hawker, J. J. Hammond and R. G. Carey, who undertook flights in 1917. Experimental mails were carried on several of the flights, the most noteworthy probably being the first flight between Melbourne and Sydney undertaken by M. Guillaux on July 16th, 17th and 18th, 1914.

Early in 1919 the Australian pilots returning from the war formed the nucleus around which Australia's pioneering flights and air services were formed. Australia was the only Empire unit outside of the United Kingdom herself which had her own Air Force. It grew out of the Australian No. 67 Squadron into Nos. 1, 2, 3 and 4 Squadrons, Australian Flying Corps, which later became the Royal Australian Air Force. This formed the very basis of Australia's efforts in the peacetime air.

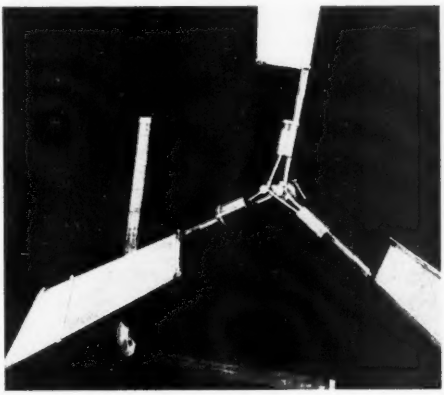
Early in 1919 the Australian Government offered a prize of £10,000 for the first Australian airmen to fly between England and Australia in a British aircraft within a period of 30 consecutive days.

The first England-Australia flight, like all great pioneering ventures, was beset by tremendous hazards. Out of the four competing aircraft three crashed and four airmen lost their lives. The Vickers Vimy, manned by Sir Ross Smith, Sir Keith Smith, Sgt. Bennett and Sgt. Shiers, was the only aircraft to complete the flight. It landed at Darwin, North Australia, on 10th December, 1919, after a journey of 28 days from Hounslow, England.

Another meritorious flight at this time was made by Captain (now Air Vice-Marshal) Wrigley and Lieutenant (now Air Commodore) A. W. Murphy, who flew an old B.E.2E from Melbourne to Darwin to meet the Vickers Vimy. They arrived at Darwin on 11th December, 1919, after completing the first flight across Australia.

AIR ROUTE PIONEERING IN AUSTRALIA

Thus ended the first long International



The three-cylinder rotary engine built by Lawrence Hargrave in 1889.

Empire flight in history, showing the Government and the public that it was possible, and also how it could be done, and arousing enormous public interest.

But already repercussions in other beneficial directions were being felt. A route across Australia for the use of such flyers as got through had to be decided on, aerodromes prepared and fuel and oil supplies laid down across the major and most difficult part of the journey in outback Australia. This was undertaken by Lieutenant P. J. McGinnis, D.F.C., D.C.M., and myself in a Ford car.

On this trip all sorts of adventures were encountered, including the first car journey in history along the southern shores of the Gulf of Carpentaria. Rivers were forded, dense bushlands penetrated, food and water ran short and were obtained in the one case by shooting game, and in the other by digging in creek beds. On occasions we were pulled out of impassable places by horses or pushed out by bush blackfellows.

Darwin aerodrome cost £700 to clear and I always remember that there were questions asked about it in our Federal House which then sat in Melbourne. They thought it far too expensive.

What I am sure did please them was the work at lonely inland Newcastle Waters

where the job was done by Australian aborigines, mainly black gins. The price paid by McGinnis was 2 bags of flour, 25 yards of turkey red cloth and 12 sticks of tobacco. Contrast this with approximately five million pounds which it is proposed to spend on Sydney's international airport.

Thus it was that in preparing the Route for the England-Australia contestants the first basis of an across Australia aerial highway was laid down which was used by the Smith Brothers, Wrigley and Murphy and a succession of flyers, and finally as part of the regular England-Australia Air Service Route.

Those pioneering flights also were indirectly responsible for the formation of The Queensland and Northern Aerial Services Ltd. (Qantas), in 1920 as a result of a meeting between Fergus McMaster, a Queensland squatter, McGinnis and myself at Cloncurry.

In 1920 and 1921 town after town in Australia was visited till at the end of the latter year few places of importance had not been visited by a surplus war stocks aeroplane flown by a returned Flying Corps Officer.

Rotary engined Avros were the most popular type used because they had a quick climb out of the inadequate landing fields available and could be adapted to carry two passengers. However, their engine reliability was not good enough and practically every tour, lucrative indeed at £3 3s. 0d. for seven minutes in the air, and £5 for a loop, always ended in a crashed aeroplane up against some fence or in a ditch, owing to engine failure or restricted fields or both.

This joy flying and epidemic of Aerial Derbys and such displays, coupled with the foundation of early Air Taxi Companies and school work, and because of the crashes, soon showed the need for proper Governmental control of aircraft operation. On 16th December, 1920, the Civil Aviation Branch of Department of Defence came into being, with Lieutenant Colonel Horace Brinsmead as the first Controller.

It was out of Major Norman Brearley's "Flying Circus" that West Australian Airways was formed in 1921. It was that

The arrival of Ross and Keith Smith at Darwin, on December 10th, 1919.

company which inaugurated the first subsidized air service in Australia as the successful contractors for the Geraldton-Derby air mail service which opened on 4th December, 1921. But in addition to Brearley's push, it was again because of the courage and foresight of Prime Minister Hughes that the Australian Government sponsored what was then regarded as a bold venture.

Unfortunately, a fatal accident marred the opening trip, the pilot and engineer being killed. However, West Australian Airways went on to do a splendid pioneering job, extending the service each end till it stretched from Perth to Wyndham and some time later established the Perth-Adelaide Service.

Following on this initial route the efforts of Qantas, led by Sir Fergus McMaster, were successful in obtaining a subsidy in open tender and the second service in Australia, and the first in Eastern Australia, was opened from Charleville to Cloncurry in Queensland on November 2nd, 1922.

A subsidy of 4/- per mile was paid for the operation of Armstrong Whitworth FK8 aircraft with a payload of some 400 lbs. The route was one of 577 miles, but as this was too far to fly in one day because of the desire to avoid flying in the heat of the day a halt was called for the night at the Longreach 267 miles post, so to speak. Another aircraft and pilot completed the other 310 miles next day.

McGinnis was the pilot on the first stage and I completed the second day's run. I well remember that the average ground speed was 67 m.p.h. The lowest ground speed we ever recorded was 44 m.p.h. against bad head winds.

At this stage it is fitting to examine the aircraft and conditions which surrounded these early operations. We have seen how the war flyers and ground engineers back from World War I were the impetus behind the new movement, and indeed supplied the then rare and highly prized piloting and air knowledge, which in those days shone halo-like over the head of these intrepid birdmen. All eyes turned when a uniformed Australian airman traversed Collins Street, Melbourne, or Pitt Street, Sydney.

These men brought with them war disposal aircraft and the following types were used for joy-riding exhibitions and general pioneering work. The BE2E, Avro 504K, D.H.4, Armstrong Whitworth FK8.

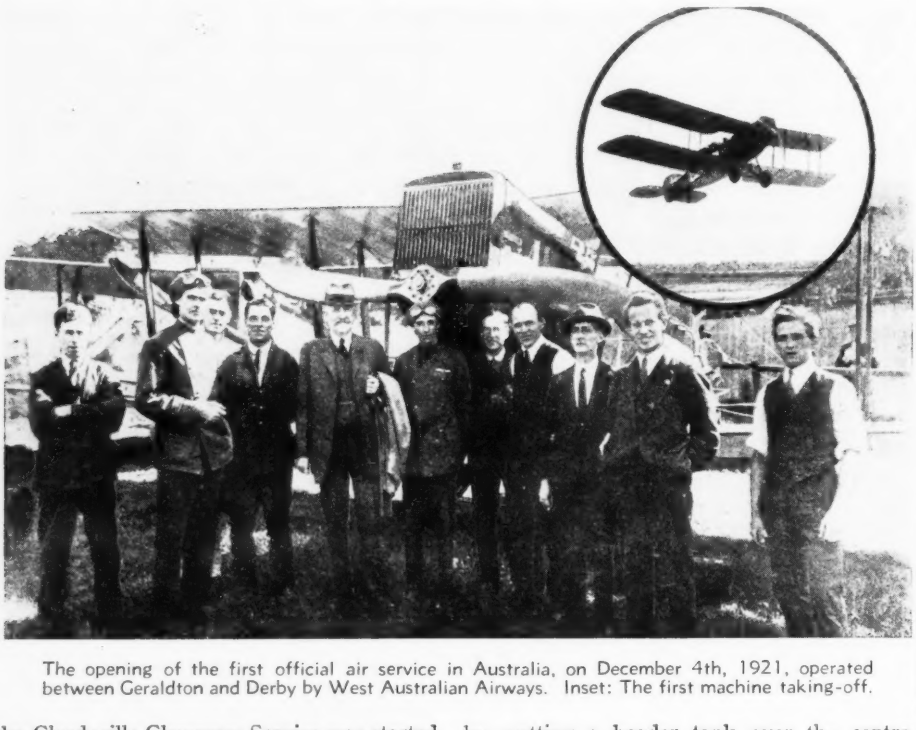
The Avro was the most popular, but suffered from engine unreliability. To get over this the Australian Aircraft and Engineering Company under the Management of Nigel Love and with H. E. Broadsmith as designer, locally fitted these Avros with Sunbeam Dyak engines. Several of these were used and the engine reliability has rarely, if ever, been exceeded by any other engine fitted and flown in a type in service and they ran some hundreds of hours between overhauls.

However, the engine weight of some 450 lbs. for 100 h.p. suffered in comparison with the Monosoupape's 300 lbs. for 100 h.p., and 150 lbs. on or off an aeroplane with a payload of about 400 lbs. meant that something had to suffer. Incidentally, the old Le Rhone handbook says the engine had to be overhauled every 30 hours of running.

It was Broadsmith who designed and built the first serious air transport aircraft to be undertaken in Australia. This was a very likely looking cabin 4-seater with 400 h.p. Liberty engine. It was ahead of its time.

Then came the first air services West Australian Airways opened with Bristol Tourers, which were converted Bristol fighters, with Puma engines, with a hump on the back which constituted the passengers' cabin. They did splendid work.

Nearly a year later " Qantas " were more ambitious and, having owned an Avro Triplane for the good of their education, tendered with Vickers Vulcans, nicknamed the " flying pig." In those difficult days of immediate post-war design for the new commercial airliners and when conditions were entirely unknown, this too was a failure, and



The opening of the first official air service in Australia, on December 4th, 1921, operated between Geraldton and Derby by West Australian Airways. Inset: The first machine taking-off.

the Charleville-Cloncurry Service was started with two A.W. FK8 aircraft and a D.H.4.

Our route, as was usual in those days, was chosen not only for its lack of proper surface communications, but because of the open country which it traversed, thus facilitating forced landings. The A.W.'s were old, their rate of climb was low, the 160 h.p. Beardmore complete actually weighed 6 lbs. per h.p. I well remember one aeroplane having no less than four forced landings on the 267 mile Charleville-Longreach journey. Pieces simply fell off here and there.

The last landing was 15 miles short of Longreach and the pilot used his shirt as a landing T to guide the relieving plane. Often the engines would boil all the way from Charleville. Water would be put in at each stop and finally the aircraft would arrive over Longreach with a plume of steam trailing from the radiator. Mr. Arthur Baird, the Chief Engineer, got over this loss by putting a header tank over the centre section which prevented the loss of water through steam.

On two trips when the very dry scorching midsummer air reached temperatures of 100 degrees to 110 degrees in the shade, the rate of climb fell off so badly that the maximum ceiling that could be reached was often as low as 4,000 feet. I have personally done a 300-mile trip on a Dyak-engined Avro across the scorching plains in which 1,200 feet was the maximum height and we were often as low as 400 feet in downdrafts. You can imagine the feelings of the poor wretched passengers sitting up behind in cap and goggles, roasted in summer and frozen almost stiff in winter.

Our summer trips in those days were a constant battle to gain height and keep engines cool.

To give you a practical instance of this trouble, in 1923 a new aircraft type was

tested at Longreach on a warm spring day. It was guaranteed to climb 10,000 feet in 13 minutes, and I remember that after one hour's hard climbing it was at 5,400 feet after having been at a maximum height of 6,200 feet some 15 minutes earlier and then lost its updraft. Such were the troubles of 1920, 21 and 23 when we were all looking for the one great thing, greater initial rate of climb, the minimum for which we set at 800 feet per minute.

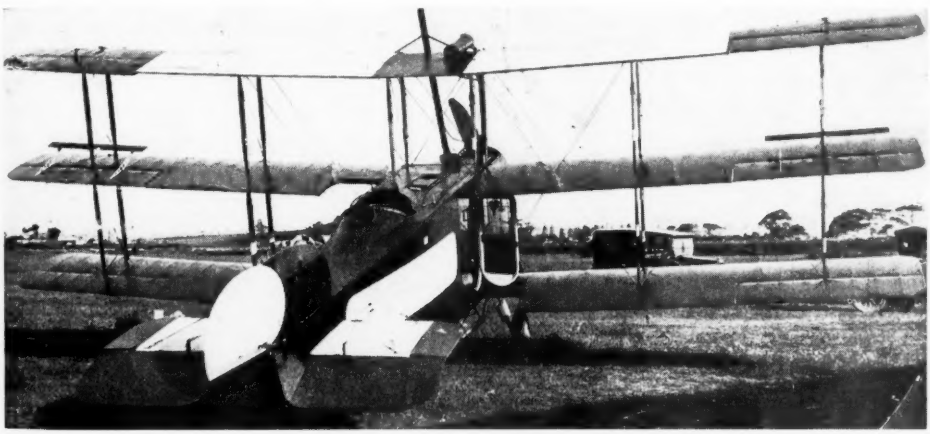
There is no doubt they were extraordinary days of air pioneering away in the back country. Away from the cities, in the roadless and bridgeless lands. Shunned by big business; laughed at by most. Days of forced landings and crashes; of hacking out emergency grounds with our own hands.

Then in 1923 we got the D.H.9C type—a successful converted D.H.9, and in 1924 the D.H.50, which was the first successful cabin type. Four passengers were carried in a cabin with a lid which closed down over their heads. The first enormous advance had been made in elimination of cap and goggles for passengers. Cruising at about 82 m.p.h. this type proved extraordinarily successful, and can be said to have been the means of giving the first real impetus to commercial aviation in Australia. Many prominent people, including Lord Stonehaven, Governor-General of Australia, and Mr. Bruce, the Prime Minister, flew in this type extensively. The doubters were not quite so sure.

Passengers cheerfully paid £21 for a 577-mile trip. Costs per ton mile came down. The 4/- per mile subsidy paid by the Government came down. Pilots and ground staff were pleased. But still in 1925 we had no lavatories in the planes—you could not get out of your seat.

There were no radio, no blind-flying instruments, no night flying and no weather reports. Our Agent in Charleville, a garage proprietor, simply kept an eye on the weather on air mail days and rang up the previous stopping place if there was a dust storm or other disturbance coming up.

One of the most important statistical records I kept in those early days was the forced landing list and whether damage to the aircraft resulted or not. Each year we would try desperately to keep these figures down. I remember two cases of engines falling out in Australia, but not on the Qantas Service, and in each case the occupants escaped. One was an Avro Avian and the other a D.H.50, and in each case the wooden propeller was to blame. Ordinary accidents were caused mainly by engine



An Avro Triplane (Beardmore engine) imported in 1922.

A D.H. 9C and D.H. 50, at Longreach, in 1924.

failure and bad landing grounds, and fatalities mostly by the common stall and spin. I have seen a Gipsy Moth come in for repairs with dog chains for centre section wires and an iron bedrail wired along a broken wing spar.

In Australia development in this 1920-1930 decade went on steadily. At Longreach, the works manager of Qantas, Mr. Arthur Baird, and staff, built D.H.50 aircraft under licence and fitted Bristol Jupiter engines, giving greater climb and nearly another 20 miles speed. The D.H.61 eight-passenger aircraft actually having a lavatory and an aisle, made its appearance. The famous Flying Doctor Service was opened in 1928. Flying Clubs were started. West Australian Airways put on the successful Vickers Viastra.

Practically all main development during this important historical decade was done by West Australian Airways, Qantas and the Larking Aircraft Company, which, commencing from June, 1924, operated regular services from Sydney to Adelaide and a Victorian network linking up with headquarters in Melbourne.

At the end of the period, the second stage of internal operations commenced with the first competitive air operations against established means of transport with the opening of inter-capital city services without subsidy, but with a mail contract. These were the services operated by the old Australian National Airways, founded by Sir Charles Kingsford Smith and Charles Ulm, both pioneers who have played their part.

This splendid service again sprang out of a pioneer flight, the first trans-Pacific flight in history, made in the famous "Southern Cross" by Kingsford Smith and Charles Ulm, with Harry Lyon, navigator, and James Warner, radio operator.

The Avro 10 aircraft, used by the old A.N.A. and the way in which they were operated, ushered in the second era in Australia, one of multi-engined transports providing much more commodious accommodation and carrying a crew of two instead of the old single-engined planes. Blind-flying aids and a few other limited refinements were provided for the first time. The public response was enormous; but depression time coupled with the over-expansion policy of the Company and the disappearance of the "Southern Cloud," brought failure in its train, then liquidation.

In 1930-31, this old A.N.A., at any rate up to the time of the present Indian Ocean operations, probably had in its employ one of the finest group of commercial pilots ever gathered together, in Kingsford Smith, Mollison, P. G. Taylor, Shortridge, Pentland, Sheppard, and G. U. Allan.

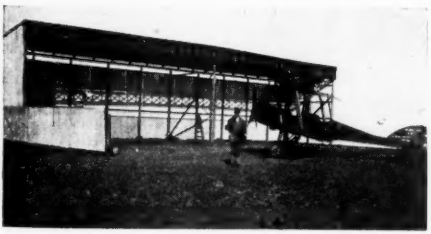
After this setback in Australian air trans-

port, which is reflected in the statistics as depression years in the air as well as on the ground, as you will see in the accompanying chart of passengers carried, little activity resulted for a few years until the new A.N.A. was formed by Holymans and other shipping interests.

Through the years it gathered momentum, till to-day the company operates Australia's major internal airlines from Perth in Western Australia, through Adelaide, Melbourne, Sydney and Brisbane, to the far North of York Peninsula in Queensland.

Other smaller internal operators are Qantas Empire Airways and Aircrafts Pty. Ltd. in Queensland, Butler Air Transport in N.S.W., Ansett Airways and Victoria and Inter-State Airways in Victoria, Guinea Airways in South Australia, and MacRobertson Miller Co. in Western Australia. I am further illustrating this growth by graphs showing Australian internal airlines in the years 1922, 1932 and 1942.

The discovery of gold in New Guinea and the inability of surface transport to keep the goldfields supplied across some of the world's wildest country, brought Guinea Airways into being in 1927. Starting operations with one D.H.37, the company was able to fly supplies from the seaport of Lae to Wau in 20 minutes' flying time, whereas native porters required seven days to do the same journey over mountainous trails hacked through the jungle. In 1928, a single-engine Junkers W.34 was put into service and later a Junkers G.31 with a payload of 7,000 lbs.

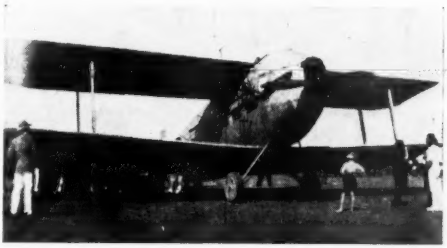


The first Qantas hangar at Longreach, Queensland, in 1921.

and a Ford 5AT (payload 3,600 lbs.) were purchased for the goldfields service.

These were the first really heavy-freight transport aircraft to be used in Australia and Mandated Territories. These aeroplanes carried, piece by piece, huge dredges and other bulky mining machinery over the mountainous jungles to the goldfields.

By 1942, when the Japanese invasion of New Guinea brought an end to the company's operations in that part of the world, Guinea Airways' fleet comprised 17 aircraft, including Junkers, Fords, Stinsons, Lockheed 10 and 14, D.H. Rapides and Moths. Between 1928 and 1942, Guinea Airways made over 60,000 flights, flew 6,000,000 miles and carried 75,000 tons of freight and 95,000 passengers. For a long time they held the world's record for air freight, and in company with other operators, carried out unique pioneering operations.



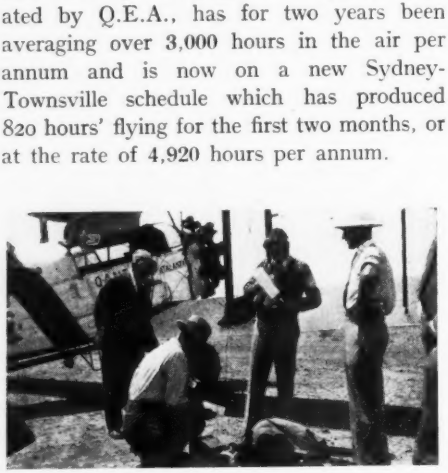
A Vickers Vulcan—1923.

The success of Australian National Airways was undoubtedly due to the use of up-to-date American equipment in the Douglas D.C.2 and D.C.3, there being no comparable British aircraft for use. These aircraft brought in quite a new standard in regard to speed, general efficiency and payability, comfort and attention to passengers, and a completely new and acceptable operating technique imported from America.

A time in the evolution of operations had been reached when public demand enabled the operation of increasing numbers of hours per annum per aircraft, steadily reducing costs per mile flown. Again we were

indebted to U.S.A. for this technique which was introduced through A.N.A. and reached extraordinary high figures, both by A.N.A. and Q.E.A., during the war. The accompanying chart illustrates this, and even the Q.E.A. Empire flying-boats were averaging 2,500 hours per annum per aircraft in the air including all time off for maintenance, and C. of A.

Lockheed 14 VH-ADT, fitted with Pratt and Whitney Wasp Junior engines, operated by Q.E.A., has for two years been averaging over 3,000 hours in the air per annum and is now on a new Sydney-Townsville schedule which has produced 820 hours' flying for the first two months, or at the rate of 4,920 hours per annum.



The arrival of mails at Mt. Isa, Queensland, in a D. H. 50 (Jupiter engine), about 1928.

American Lockheeds and Douglases, therefore, held the field in regard to the main airlines; but in the smaller feeder line category and in training and private ownership, de Havillands still held sway with their "Dragon" and "Rapide," and with the "Tiger," "Hornet" and "Leopard" Moths.

In regard to the progress of economical operations, the main inter-city lines had reached a period where they went little short of paying from passenger revenue alone, and with the added mail revenue, proved lucrative. Air mail surcharge payments proved the backbone of the line. Most of the smaller lines, however, required some sort of more direct subsidizing.

The D.H. 50 "Victory," which inaugurated the "Flying Doctor" services from Cloncurry in 1928.

At the time of preparing this lecture, the position of Australia's internal airlines is politically difficult and has been brought to a head by the financial success of local airlines in recent years, the noteworthy heavy increased traffic being carried clashing with Government policy and the State railways. Also the realization that if Australia is to keep her place alongside other progressive nations, a vast increase in air transport must come about in Australia within the next twenty years, which would necessitate co-ordination with rail and road transport.

The difficulty is that in Australia there are six States which control their own transport. This should obviously be handed over to the Commonwealth, yet they have never been able to agree unanimously to do this. A referendum was taken recently when the people as a whole were asked to vote this reform, but the question was lumped in with banking and other measures, and lost.

Now the Commonwealth Government of Australia proposes to go ahead and legislate to operate its own services between States; but the main internal privately-owned airline may legally challenge this. And so the argument proceeds and with little hope of real progress till it is cleared up and a body set up by the Commonwealth which will prove progressive and efficient to cater for all civil aviation in Australia, and at the same time prove acceptable to the individual States who own and operate their own State transport. Any entry into the air arena by a State or States, would put the clock back

severely in the development of transport within Australia.

THE EMPIRE AIR PIONEERS

Now after this historical preliminary and telling you something of the development of our internal air enterprise in Australia, we must turn to Empire air development, to which this lecture is dedicated, and especially as it affects Australia.

This extraordinary colourful story opens with the tale of the early Empire air adventurers who followed on the end of the last war. Those Columbuses and Captain Cooks of the air who, driven by sheer love of adventure or by necessity, or both, who so clearly led the world in their path-finding and record-breaking attempts over new and untried places.

The glorious failures were a highlight feature as in all true pioneering work—and many pioneers now lie in lonely graves or unknown places in land or sea. The name of Australian air enterprise is written in broad script across these early attempts and their toll was paid. Hinkler lies in a lonely grave high in the Italian mountains. Kingsford Smith in the Indian Ocean, Ulm in the wide Pacific.

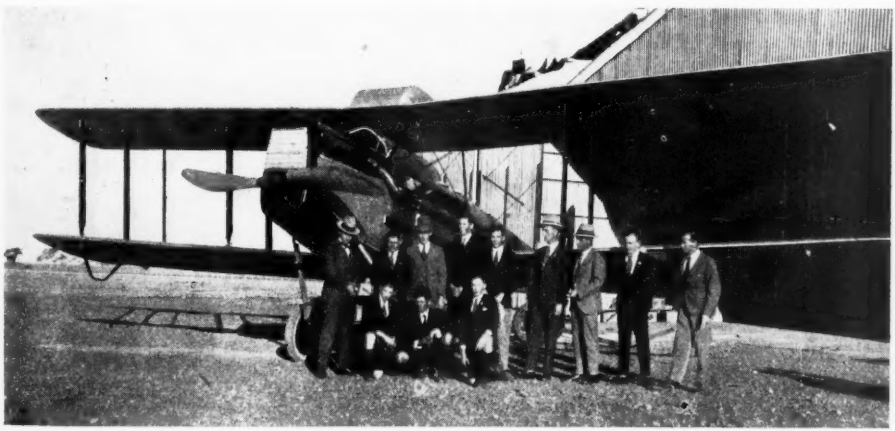
The Atlantic Flight in 1919 proved the first magnet to the adventuring Empire airmen, and it was an Australian, Harry Hawker, who, by his courageous failure, won early world acclaim. It is almost true to say " There could be no honour in a sure success, but much might be wrested from a sure defeat."

Accompanied by his navigator, Commander Mackenzie Grieve, Hawker took off for Ireland from St. John's, Newfoundland, on the afternoon of May 18th, in his Sopwith biplane, powered by a Rolls-Royce Eagle VIII engine of 375 horse-power. Immediately after the take-off Hawker, by means of a special trigger release attachment, dropped the undercarriage of the Sopwith, thus gaining added air speed and range on the flight itself and risking minor mishap on the eventual landing.

In foul weather and continuously nursing a motor handicapped by a partial blockage of the water circulation system, Hawker battled on for 14½ hours and covered two-thirds of the Atlantic crossing before engine failure eventually forced him down within rescue distance of a small steamer.

Hawker's glorious failure was followed shortly after by the success of Alcock and Whitten Brown.

In a Vickers Vimy, powered by two Rolls-



A D.H.50 built at Longridge.

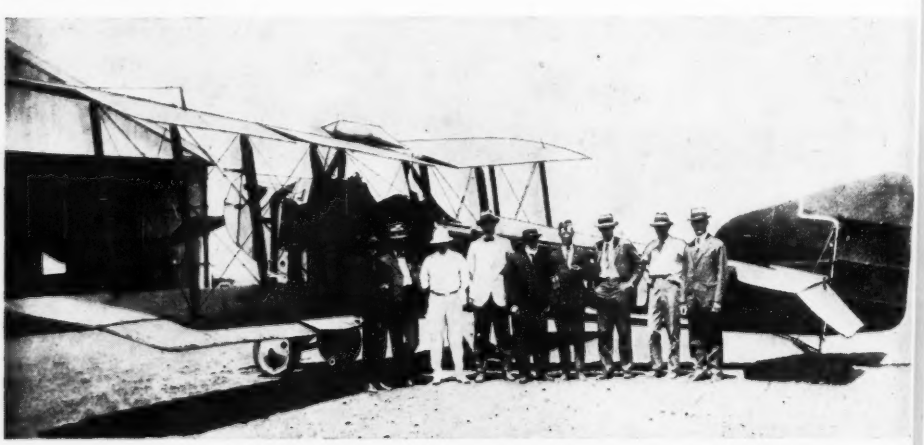
Royce Eagle VIII engines, Alcock and Brown took off from St. John's, Newfoundland, on the afternoon of June 14th, 1919. The Vimy was a standard type Air Force bomber, fitted with extra tanks which gave it an estimated range of 2,400 miles. Fully loaded, the Vimy weighed 13,300 lbs., and its cruising speed was 90 m.p.h.

The following morning, Alcock and Brown landed at Clifden, Ireland, after completing the first non-stop flight over the Atlantic, a distance of 1,890 miles, in 15 hours 57 minutes at an average speed of 110 m.p.h.

Three N.C. flying-boats of the United States Navy took off from Trepassy Bay, Newfoundland, on May 16th, 1919, for the Azores, on the first stage of a trans-Atlantic flight. Only one flying-boat, piloted by Lt. Commander A. C. Read, reached the Azores, and this aircraft continued the flight to Lisbon and Plymouth, where it alighted on May 27th.

Interest in preparations for the flight across the Atlantic fostered the suggestion that the Australian Government should offer a prize for the first flight from Britain to Australia. With typical foresight and courage, Mr. W. M. Hughes, Australia's famous wartime Prime Minister, was quick to sense the possibilities of such a suggestion. In March, 1919, the Australian Government announced that it would award £10,000 to the first Australian airman who succeeded in flying from England to Australia in a British aircraft in 30 days. The offer was to remain open until midnight on December 31st, 1920.

This competitive flight brought forth six entrants: (1) Captain G. C. Matthews and Sergeant T. D. Kay in a Sopwith "Wallaby" biplane with Rolls-Royce Eagle VIII engine; (2) Captain Ross Smith, Lieutenant Keith Smith, Sergeant J. M. Bennett and Sergeant W. H. Shiers in a Vickers "Vimy" powered by two Rolls-Royce Eagle VIII engines; (3) Lieutenant R. Douglas and Lieutenant J. S. L. Ross in an Alliance "Endeavour" biplane powered by one 450 h.p. Napier "Lion" engine; (4) Captain G. H. Wilkins (later Sir Hubert Wilkins), Lieutenant V. Rendle, Lieutenant D. R. Williams and Lieutenant G. H. Potts in a Blackburn "Kangaroo" biplane (two Falcon III Rolls-Royce engines each of 275 h.p.); (5) Captain C. E. Howell and A/M G. H. Fraser in a Martinsyde biplane (one Falcon III Rolls-Royce of 275 h.p.); and (6) Lieutenant R. J. Parer and J. C. McIntosh in a D.H.9 (one 200 h.p. Siddeley "Puma").



Arrival of the first air mail at Longridge, in 1922.

Of the six competing aircraft, only two reached Australia—the Vickers Vimy and the D.H.9. Douglas and Ross were killed when their Alliance crashed a few minutes after taking off from Hounslow. Howell and Fraser were drowned when their Martinsyde was forced down into the sea off Corfu. Matthews and Kay abandoned their attempt at Bali, in the Netherlands East Indies, after a series of minor and major mishaps, and the Blackburn "Kangaroo" suffered an engine breakdown at Crete in the Mediterranean which put that entry out of the race.

Parer and McIntosh left Hounslow on January 8th, 1920, and, after an amazing series of adventures and mishaps, which might well have deterred any less stout-hearted adventurers, arrived at Darwin on August 2nd—a journey of seven months.

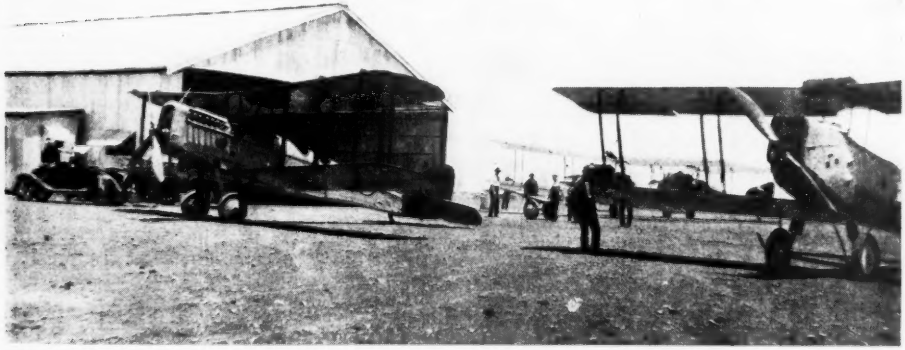
The flight of the Vickers Vimy was a performance truly worthy of the world-wide acclaim it received. The Vimy was a standard bomber of the same type as the aircraft in which Alcock and Brown had made the first west-east crossing of the Atlantic. It had tanks for 865 gallons of petrol and had a cruising range of about 1,100 miles.

Leaving Hounslow on November 12th, the Vimy ran into dense cloud, snow, and blinding rain, which persisted throughout their journey across Europe to Taranto in Italy. This section took 5 of the 30 days allowed for the flight to Australia. Through Cairo, Damascus and Baghdad, the weather continued unfavourable, and it was on the Baghdad to Basra section, on November 21st, that the Vimy crew experienced their first good flying day since leaving England.

From Basra the flight continued to schedule through Bandar Abbas, on the Persian Gulf, Karachi, Delhi, where a day was spent working on the engines and airframe, Allahabad, Akyab, Rangoon, Bangkok, to Singora where, they had been informed, a good landing ground had been prepared.

The Siamese notion of a good aerodrome nearly brought the "Vimy" flight to an untimely end. A square patch had been hewn out of the jungle, the trunks and upper portions of the trees had been removed, but the stumps were allowed to remain. It was only Ross Smith's superb piloting that brought the Vimy down safely in this maze of hazards.

Singapore was reached on December 4th, and the following day a landing was made at Kalidjate, near Batavia, in Java. At Sourabaya, the next stopping place, it taxed the full ingenuity of the crew to extricate the Vimy from what at first sight appeared an impossible position. The landing ground at Sourabaya had been made on reclaimed



A group of Qantas aircraft, in 1923.

The Vickers Vimy (left) at Fanny Bay aerodrome, Darwin, on December 11, 1919, and a BE2E (right), which had made the first flight across Australia from Melbourne to Darwin to meet the England-Australia pioneers.

ground, forming an apparently hard surface but soft underneath. The Vimy became seriously bogged on landing.

It was then that Ross Smith devized a system that, more than 20 years later, in the form of steel landing mats, was to prove so useful for the Allied Air Forces in World War II. Ross Smith had bamboo mats laid over the boggy aerodrome at Sourabaya, thus forming a runway measuring 350 yards long and 40 yards wide from which the Vimy made a perilous take-off for Bima on the island of Soembawa. The next day the Vimy reached Atamboea in Timor, the final jumping-off point for Australia.

On the morning of December 10th, the Vimy took off from Atamboea, safely crossed the Timor Sea, and, late that afternoon, landed at Darwin. The duration of the flight, with all stops, was just under 28 days. The actual flying time for the journey of 11,340 miles was 135 hours. The crew had won the Federal Government prize of £10,000, and one of the outstanding long-distance flights of all time had been performed by a British aircraft manned by Australian airmen.

Hard on the heels of the Smith Brothers' flight from England to Australia, came two more Dominion trail-blazers in Pierre van Ryneveld and Quinten Brand, the South Africans who made the first London to Cape Town flight. They, too, used a Vickers Vimy for the early stages of their flight, but an unfortunate crash compelled them to complete their journey in a D.H.9. This pioneering flight was made between February 4th and March 20th, 1920, and the actual flying time was 109½ hours.

The next airman whose long-distance flights flashed across the aviation screen was Sir Alan Cobham. His contribution to the establishment of Empire air routes is outstanding.

In 1924 he was chosen to fly Sir Sefton Brancker, Director of Civil Aviation, from London to Rangoon and back, a distance of 17,000 miles, with the object of surveying a possible air route to India. The journey was begun on November 20th, 1924, and finished on March 17th, 1925, without a hitch.

On November 16th, 1925, Cobham began his great flight from London to Cape Town and back. He flew in the same machine, a D.H.50, which he had used for his Rangoon flight, but the early Siddeley "Puma" was replaced by an Armstrong Siddeley "Jaguar" of 335 horse-power. He returned to London on March 13th, 1926, after obtaining valuable data for the establishment of regular services on the London-Cape Town route.

His greatest flight undoubtedly was the

London-Australia-London journey, made in 1926, and in which he covered a total distance of 28,000 miles. For this, the first England to Australia and return flight, Cobham had floats fitted to his D.H.50, and he followed a route closely approximating that taken by the Empire flying-boats some 22 years later.

On the outward journey he had the misfortune to lose his mechanic, Elliott, who, while the machine was flying low over swamp land near Basra, was struck by a bullet fired by a wandering Arab and died a few days later in Basra hospital. The Royal Air Force loaned Cobham another mechanic and he continued his historic journey to a successful conclusion by landing on the Thames outside the Houses of Parliament on October 1st, 1926.

Another important Cobham flight was his aerial survey round Africa which was made in 1927-28 in a Short "Singapore" flying-boat. This, as with all his previous long-distance flights, was made with the sole object of collecting data for the establishment of future aerial communications.

Early in 1928 another Australian pilot was to spring overnight into world prominence by making a solo flight in a light aeroplane from England to Australia in the record time of 15½ days. This was Bert Hinkler. His aircraft was an Avro Avian fitted with a Cirrus motor, and his remarkable flight was aptly publicized by London " Punch " in a paraphrasing of a well-known jingle:

" Hinkle, Hinkle, little star,
Sixteen days and here you are."

Hinkler, by demonstrating the long-distance capabilities of the light aeroplane, did much to popularize flying and to draw attention to the speed at which the Homeland could be linked to Australia.

It was in 1928, too, that Charles Kingsford Smith gave a striking demonstration of piloting skill and endurance that was, step by step, to attain a peak never before reached by any airman. Accompanied by Charles Ulm, co-pilot, Harry Lyon, navigator, and James Warner, wireless operator, Kingsford Smith took off from Oakland, California, on May 31st, to attempt the first flight across the Pacific Ocean. The aircraft, the famous "Southern Cross," was a Fokker F7 monoplane powered by three Wright " Whirlwind " engines, each of 220 horse-power.

As is the case with so many pioneering ventures, the Pacific flight was termed " suicidal," but Kingsford Smith confounded the critics by landing at Brisbane, Queensland, on June 9th, after an over-water journey of 7,400 miles, completed in 83 hours 38 minutes flying time.

On September 11th of the same year, Kingsford Smith flew the "Southern Cross" from Sydney to Christchurch, New Zealand, a distance of 1,630 miles, which was covered in 14 hours 25 minutes. This was the first flight between Australia and New Zealand. Kingsford Smith's time was lowered to 12¼ hours by Guy Menzies, a young Australian pilot, who flew solo in an Avro Avian from Sydney to Herpo on the South Island of New Zealand, on January 7th, 1931.

In 1930, Kingsford Smith flew the " Southern Cross " from Australia to England, and on June 24th of that year he made the first successful east-west crossing of the Atlantic Ocean by flying from Dublin, Ireland, to Harbour Grace, Newfoundland, in 31½ hours.

Kingsford then turned his attention to the England-Australia flight record of 15½ days held by Bert Hinkler. In an Avro Avian, Kingsford Smith left England on October 9th, 1930, and arrived at Darwin in 9 days 21 hours 40 minutes. In April, 1931, C. W. A. Scott in a D.H. Moth with a Gipsy engine, clipped 18 hours off Kingsford Smith's time, only to have C. A. Butler, in a Comper " Swift " with a 75 h.p. Pobjoy engine, take the honours by a two-hour margin later in the same year. Kingsford

Smith took up the challenge again in 1933 in a Percival Gull monoplane with a Gipsy Major engine, and lowered the England-Australia record to 7 days 4 hours 44 minutes.

The lure of the England-Australia flight appealed not only to the male members of the aviation fraternity. Amy Johnson, in May, 1930, had the spotlight of publicity focused on her by making the first England-Australia solo flight by a woman, in a D.H. Moth powered with a Gipsy I 85/100 h.p. engine. Her time for the journey was 19 days 11 hours, and in view of the fact that she had only had some 80 hours' flying experience, her long flight was a truly remarkable achievement. In 1934, Jean Batten lowered Amy Johnson's time for the England-Australia flight to 14 days 23 hours and followed this up by flying solo from Australia to New Zealand.

The Centenary Air Race from Mildenhall to Melbourne for the MacRobertson prize of £10,000, created a record in 1934 that remained unchallenged until the outbreak of war. C. W. A. Scott and Campbell Black in a D.H. Comet monoplane, specially designed for the contest, flew from Mildenhall to Darwin in 2 days 4 hours 33 minutes. They completed the whole course from Mildenhall to Melbourne, a distance of 11,300 miles, in what was then the staggering time of 2 days 22 hours 54 minutes 18 seconds, and won both the speed race and the handicap against 20 competitors representing eight countries.

K. D. Parmentier and J. J. Moll (Dutch) in a Douglas D.C.2, put up a splendid performance by gaining second place in both the speed race and handicap race, while Colonel Roscoe Turner and Clyde Pangbourne (U.S.A.) won third place in the speed race in their Boeing Transport monoplane.

In tracing the remarkable speeding up of transit time on the England-Australia flights, it is only right that the splendid ground organization and general assistance provided by the major oil companies should be given well-deserved credit. Organizations such as Shell, Wakefield and Vacuum, were always ready and prepared to provide not only fuelling facilities, but many other services, without which the record breakers could not have progressively lowered the time for a journey half-way across the world.

What a fine contribution to the future all these wonderful flights were, and to those who backed the flights; the Rt. Hon. W. M. Hughes, and the Australian Government, Sir MacPherson Robertson, Lord Wakefield and many others. So the stage was set for the coming of the Civil Air Transport flyers and the early company formations which led to the establishment of regular air routes and then to the Empire airways.

GENESIS OF THE EMPIRE AIR SERVICES

It is now appropriate to examine and trace the origin and growth of Empire air services.

As far back as 1917, a Civil Aerial Transport Committee stated *inter alia* that " It is obvious how important a bearing the improvement in inter-imperial communications is likely to have on that greatest of problems, the probem of the future relations to one another of the self-governing States of the British Empire."

At the conclusion of World War I, the officer commanding the Royal Air Force in the Middle East, Maj.-General Sir W. G. H. Salmond, found his command with large numbers of aircraft, equipment and personnel with nothing to do. With commendable far-sightedness, he organized parties to survey the routes to India and South Africa with a view to the ultimate establishment of air transport services.

In due course, the Royal Air Force in Egypt and Iraq established a regular service across the Syrian Desert, one of the most inhospitable stretches of country in the world.

In 1919, efforts were made in Great Britain and on the Continent of Europe, to turn aviation into commercial channels. Air transport was, however, unable to attract sufficient revenue to be self-suporting and the British air transport companies found themselves facing both foreign subsidized competition and bankruptcy. A committee appointed by the British Government in 1923 to enquire into air transport, recommended the creation of a new organization which would embrace the four existing companies and should, in the Committee's own words, " be run entirely on business lines with a privileged position with regard to air transport subsidies."

Thus on March 31st, 1924, Imperial Airways, Limited, was incorporated as the national air transport company with the mission of developing British commercial aviation on a commercial basis. The following month a daily service was started between London and Paris, followed in rapid succession by daily services from London to Cologne, and to Zurich. In November, 1924, Imperial Airways commissioned the Handley Page W8F class, " City of Washington "—the first three-engined airliner to be used in regular service.

These were followed in 1931 by the Handley Page "Hannibal" and "Heracles" and D. H. " Hercules " class. The Hannibal, with its four Bristol engines, carried 42 passengers in, for those days, amazing reliability, safety and comfort. For the first time, real " hotel " service was given in the air, and Mr. F. Handley Page (now Sir Frederick) and Mr. George Woods Humphery, gave something new and progressive to the Air Transport world, and went away to a clear lead on a policy all have now copied.

Then began the bad old days of air transport in the British Isles, and the slow and painful strangulation of British air transport for want of support and foresight. Imperial Airways went down fighting for the " go ahead " signal which they never got.

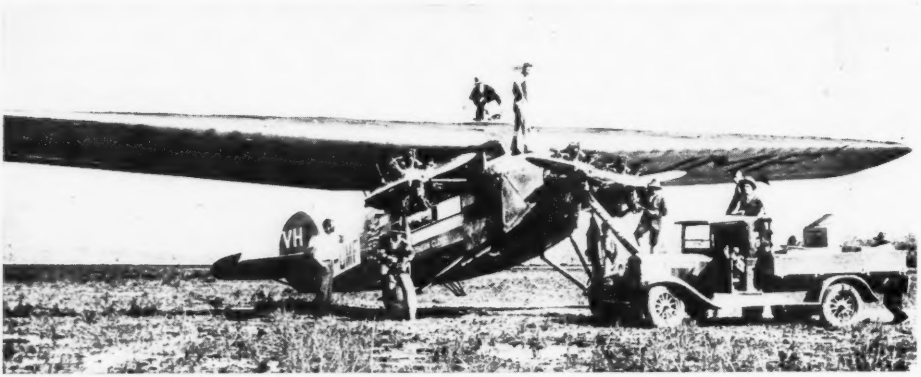
During 1925, a joint survey by the British Government and Imperial Airways of the Cairo-Karachi air route was completed. In December, 1926, a fortnightly mail and passenger service was commenced between Cairo and Basra, thus forging the first link in the England-India service chain. The frequency of the Cairo-Basra service was increased to once weekly in April, 1927.

The following year the first of the three-engined "Calcutta" class flying-boats was commissioned, and in succeeding years this sturdy, reliable flying-boat gave excellent service on the Taranto-Alexandria section of the England-India-Australia air route, across the Mediterranean. It also gave Imperial Airways' personnel experience in the operation of flying-boats that was to prove so valuable on the introduction of the famous Empire Class flying-boats.

In March, 1929, Imperial Airways commenced operation of a weekly service between London and Karachi. International difficulties made an all-air service impossible on this route and passengers were obliged to make the Paris-Brindisi section by train. The London-Karachi service was extended to Delhi in December, 1929, the Indian State Air Services being responsible for the Karachi-Delhi service, flying aircraft chartered from Imperial Airways.

In 1929 and 1930, Imperial Airways and the Air Ministry carried out an operational, technical and commercial survey of the Capetown-Cairo air route, and in February, 1931, a weekly service was inaugurated between London and Central Africa, terminating at Mwanza, Tanganyika Territory. In January, 1932, the London-Central Africa service was extended through to Cape Town.

In April, 1931, Imperial Airways undertook the carriage of experimental mails to Australia and with the co-operation of two Australian air transport companies, Qantas and the original Australian National Airways, these experimental services were highly successful. Imperial Airways



The Avro 10 " Southern Cloud," used by Australian National Airways in 1930.

delivered the mails to Koepang, Timor, Kingsford Smith carried them over the Timor Sea from Koepang to Darwin in a three-motor Avro 10, and Qantas completed the Darwin-Melbourne section using a D.H.61.

At this point, it is interesting to trace the expansion of Qantas services which enabled that organization to participate in the first England-Australia air services.

Qantas had opened its original service between Charleville and Cloncurry in Western Queensland, in November, 1922. The northern terminal was extended to Camooweal in February, 1925, and the southern terminal was extended to Brisbane, the capital city of Queensland, in April, 1929.

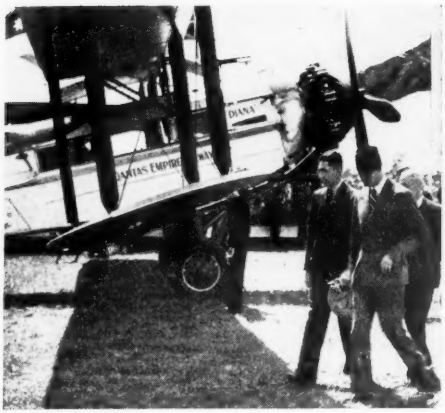
In the latter extension lies a somewhat strange fact. The majority of transport systems originate in the centres of densest population and gradually extend into areas more sparsely populated. Qantas reversed this process by originating its operations in the sparsely populated " outback " districts and by completing, some seven years later, an air link with the capital city. Qantas, in 1931, therefore, was in a position to play its part in conveying the experimental mails from Darwin to the Southern States, a goal which had been set when the company was formed in 1921.

Imperial Airways in 1931 were responsible for the commissioning of two types of aircraft which were to introduce a new level of passenger comfort and reliability. These aircraft were the Handley Page "Hannibal" and the Short " Scipio." The " Hannibal " was a four-engined airliner with accommodation for 42 passengers in a degree of spaciousness and comfort that was far ahead of anything then provided by any air service in the world. With a buffet on board from which meals and alcoholic beverages were served in flight, it is little wonder that the " Hannibal " airliners enjoyed well-merited popularity with the air-travelling public. The " Scipio " was a four-engined Short Bros. flying-boat, and here again passenger comfort and reliability were combined to make an outstanding commercial aircraft.

In the following year Imperial Airways put into commission the " Atalanta," the first of the four-engined monoplanes that were to perform sturdy service on the Karachi-Singapore section of the England-Australia service.

The year 1933 was an important milestone in Australian overseas air service history, in which Sir Eric Geddes, Chairman of Imperial Airways, and Mr. George Woods Humphery, played a leading part.

In March of that year an agreement was reached between Imperial Airways and Qantas whereby the two companies would



H.R.H. the Duke of Gloucester and Mr. Hudson Fysh inspecting the D.H. 61 which inaugurated the first overseas air mail from Brisbane, on December 10, 1934.

associate in submitting tenders for the proposed Brisbane-Singapore air mail contract. Imperial Airways soon after despatched to Australia the four-engined Atalanta type aircraft " Astraea " under the command of Major H. G. Brackley, D.S.O., D.S.C., who proved an outstanding air ambassador. The visit of the " Astraea " to Australia created a great impression. Its size was something of an embarrassment as there was no hangar capable of housing it.

When the " Astraea " departed on its return flight to London in July, 1933, I had the privilege of accompanying Major Brackley. Fourteen days after leaving Darwin we arrived in London, where discussions were immediately commenced with Mr. Woods Humphery and Major Mayo of Imperial Airways and the technical staff of De Havil-

A Handley Page H.P. 42 Hannibal class—1931.

lands, with the object of evolving a commercial aircraft suitable for submitting in open tender for the Brisbane-Singapore air mail contract. Such a machine, the D.H.86 Commonwealth airliner, was designed, constructed and tested in record time, and afterwards proved very successful in commercial operation.

In July, 1933, the London-Karachi service was extended to Calcutta, and in December of that year Singapore became the terminal point. The Empire air route, by dint of the courageous efforts of the early pioneers and later by efficient survey, organization and plain hard work, was gradually extending towards Australia.

FIRST EMPIRE AIR SERVICE OPENS AND PROGRESSES

In January, 1934, there was announced the formation of Qantas Empire Airways Ltd., an organization combining the interests of Imperial Airways and the pioneer Australian company, Qantas. In April of that year the Australian Government announced that Qantas Empire Airways in open tender had secured the air mail contract for the Brisbane-Singapore service. This contract was for a period of five years, an encouraging improvement on the original air mail contract time of one year. The five-years contract gave a security of tenure and an opportunity for forward planning, which was sadly lacking in earlier contracts secured by Qantas.

The first Brisbane-London service was despatched by H.R.H. The Duke of Gloucester on December 10th, 1934, by a fortuitous coincidence the 14th anniversary of the arrival of the Vickers " Vimy " at Darwin on completion of the first England-Australia flight.

The D.H.86 aircraft quickly proved that it had been wisely designed and well constructed for the task that it had to perform on the Brisbane-Singapore service.

The D.H.86 introduced the following

important new features to Australian air service operations:

(i) Two pilot control—Captain-navigator, and first officer-wireless operator;
(ii) Four engines;
(iii) Radio—short and medium wave plus "homing";
(iv) Adjustable chairs and sound-proofed cabin.

The schedule for the Brisbane-Singapore service provided for a transit time of 3½ days for the 4,361-mile journey, and for some time this was the fastest overseas commercial air service in the world. The longest one-day flight was 1,323 miles,and in this connection it is interesting to compare in the following table the increase in one-day stages progressively made by Qantas services:

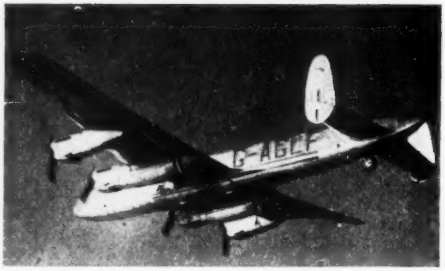
1923 — 311 miles
1929 — 577 miles
1932 — 711 miles
1936 — 1,323 miles
1945 — 3,513 miles (28 hours' Catalina flight)

The Armstrong-Whitworth Atalanta class "Astraea," flown to Australia in 1933.

Passengers, mail and freight loadings on the Brisbane-Singapore service greatly exceeded the original estimates, and in May, 1936, it was found necessary to introduce a twice-weekly service.

Despite accidents involving the loss of other D.H.86 aircraft, the five D.H.86 machines flown by Qantas on the Brisbane-Singapore service put up the outstanding record of flying 2,681,000 miles over a period of 3½ years without causing injury to passengers or crew. Credit for this performance is three-way:

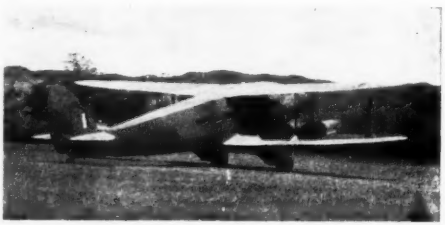
(1) reliable aircraft;
(2) excellent piloting;
(3) efficient servicing and load distribution;



In May, 1945, Avro Lancastrians began a direct service between the United Kingdom and Australia, operated jointly by B.O.A.C. and Q.E.A.

In 1935, the British Government announced its plans for the Empire Air Mail Scheme, whereby all mail originating in Great Britain would be conveyed to destinations within the Empire by air without a surcharge. This was a most important and ambitious step in the long history of mail carriage. In the words of one commentator, "air mail loads will now be reckoned in tons, not pounds."

To provide for such loadings and the increased frequencies that the Empire Air Mail Scheme demanded, Imperial Airways set about the provision of new-type aircraft, the outstanding one of which was undoubtedly the Empire flying-boat. The building of runways of sufficient size to



A D.H. 86 of Q.E.A. on war service, in 1942. Specially built for the Brisbane-Singapore section of the Australian route, the D.H. 86 went into service in 1934.

accommodate large land machines was at that time out of the question and operators' attention was focused on the flying-boat. The Empire route provided ample natural bases for flying-boat operations and in the face of considerable opposition, some of which emanated from Australia, agreement was at length made between all the participating partners in the Empire Air Mail Scheme.

In 1936, the first Empire flying-boat came off the slips at Short Brothers' Rochester Works and in its test flights fully justified the early predictions that it would make a new era in air transport. The highest credit is due to Mr. Woods Humphery, Major R. H. Mayo, Mr. A. Gouge and all others responsible for the conception, design and construction of this outstanding aircraft. Also for their courage, born of commendable confidence, in proceeding with the simultaneous construction of 28 of these flying-boats without awaiting the results of flight testing a prototype, though the Short "Scion" was in reality a miniature Empire flying-boat on wheels, and was, perhaps, the insurance behind this seemingly bold project.

The Empire flying-boat provided the four-engine reliability which had been so well demonstrated in the "Hannibal," "Scipio," "Atalanta" and D.H.86 aircraft. It set an entirely new standard of comfort by providing spacious cabins in which passengers could promenade at will. It gave facilities for meal service comparable with the best hotels. The adjustable lounge seats could be readily converted to provide for sleeping accommodation, and the efficient silencing of the Bristol "Pegasus" engines added considerably to passenger enjoyment.

In December, 1937, Captain J. W. Burgess piloted the Empire flying-boat "Centaurus" to Australia and New Zealand. Practical demonstration, including a tour of Australian capital cities arranged by Mr. A. E. Rudder, Vice-Chairman of Q.E.A. and T.E.A., quickly dispelled the criticism that had previously existed with regard to flying-boats and their operation.

On July 5th, 1938, the first flying-boat on the England-Australia service arrived at Sydney, and on the same day the first flying-boat departed from Sydney for London, inaugurating the service. The following month, a thrice-weekly service was introduced on the England-Australia route.

In April, 1940, Tasman Empire Airways Ltd. was incorporated to combine the interests of Great Britain, Australia and New Zealand for the operation of a flying-boat service between Australia and New Zealand. In the same month, the Sydney-Auckland service was inaugurated on a once-weekly basis, which was increased in August, 1940, to three services per fortnight in each direction, and is now operating four times weekly in each direction.

All through the war when shipping was almost non-existent, Tasman Empire Airways, with the two Empire flying-boats "Aotearoa" and "Awarua," continued regularly, week in week out, to fly the 1,380-mile Tasman crossing. Up to March 31st, 1945, they had flown 1,235,480 miles, and carried 14,470 passengers and 749,840 lbs. of freight and mail.

QANTAS AT WAR

The first impact of the outbreak of war on the Empire Air Service was recorded by the reduction of through services from England to Australia, and a twice-weekly service was immediately inaugurated.

Within three weeks of the beginning of hostilities, the R.A.A.F. commandeered and converted two Empire boats. Crews from the flying staff were seconded to form the nucleus of a flying-boat squadron, which was later to require two more boats and additional personnel, including engineers.

This squadron was destined to play a major part in the defence of Australia and carried out an immense survey programme throughout the islands to the north and east of the continent. It was also responsible

for the relief and rescue of a large number of service personnel and evacuees from isolated points.

The Empire schedule was maintained until the entry of Italy into the Mediterranean sphere, when regular services between Cairo and London were discontinued.

It meant that services west of Cairo were re-routed to Durban, or what was to be later known as the " Horseshoe " route. Passengers, mails and freight, were transhipped to surface transport from Durban to England.

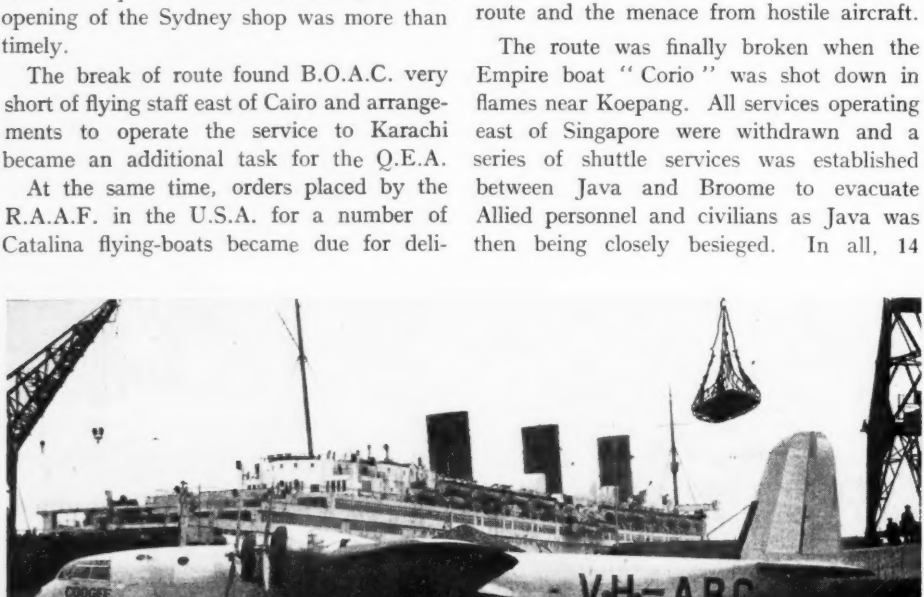
The benefit of a far-sighted plan to establish an engine-overhaul workshop at Sydney proved its value, as previously all major overhauls were forwarded to Bristol. Neither Durban nor Cairo was able to cope with the requirements of the service, and the opening of the Sydney shop was more than timely.

The break of route found B.O.A.C. very short of flying staff east of Cairo and arrangements to operate the service to Karachi became an additional task for the Q.E.A.

At the same time, orders placed by the R.A.A.F. in the U.S.A. for a number of Catalina flying-boats became due for delivery. America was not then in the war, and deliveries could only be made on a cash and carry basis. Because of the long-distance over-water experience gained by Q.E.A. personnel, the Australian Government requested that the Company should take over the task. In all, 19 Catalinas were flown across the Pacific to Australia without incident. The knowledge acquired during this programme of long-range work was to play a major part in the re-establishment of Empire services later on.

A major portion of the Qantas-operated portion of the Empire route bore full brunt of the Japanese attack on Malaya and the East Indies in December, 1941, but a service was maintained with remarkable regularity despite the many unpredictable changes of route and the menace from hostile aircraft.

The route was finally broken when the Empire boat " Corio " was shot down in flames near Koepang. All services operating east of Singapore were withdrawn and a series of shuttle services was established between Java and Broome to evacuate Allied personnel and civilians as Java was then being closely besieged. In all, 14



The Short Empire flying-boat " Coogee " of Qantas Empire Airways, alongside the " Queen Mary " at Southampton.

flights were made before they had to be discontinued because of enemy action. Two boats were destroyed by the enemy on the water at Broome, and a third, "Circe," was missing in flight between Tjilatjap (Java) and Broome (Australia).

Australia was then left devoid of overseas air communications until the U.S.A. Army and Navy established their Pacific services. The aircraft were withdrawn to the east coast of Australia, running the gauntlet through the Darwin area, which had also received the savage attention of the enemy.

Then followed a short period of anti-climax. Q.E.A.'s only service operating on regular schedules was the inland from Brisbane to Darwin, via the Western Queensland points.

The usefulness of the Empire boats seemed to be at a very low valuation, but that impression was not allowed to last long.

The Japanese menace was steadily increasing and the flying-boats began a useful life as troop carriers. When stripped of all unnecessary fittings, seats, linings, kitchen equipment, heaters, and the permissible all-up load increased from 40,500 lbs. to 43,500 lbs., an annual increase of approximately 1,011,920 traffic ton miles was obtained, made up of 750,600 traffic ton-miles, on account of the extra all-up load, and 261,320 for the saving in weight, which amounted to over 600 lbs. per boat.

During the height of the New Guinea campaign, flying-boats made 765 flights carrying 24,167 front-line troops and their equipment to battle stations, evacuating casualties on the return trips. These machines put up a total of millions of flying miles during the period.

Australia's internal services, A.N.A., Ansett and Guinea Airways also played a major part in supplying transportation for urgent war measures, together with Carpenter's Airlines, which snatched rescues off beaches under the noses of the advancing Japanese.

Using D.H.86's usually employed on the inland route, Q.E.A. made a series of rescue flights to Mount Hagen in New Guinea at a time when Port Moresby was suffering the full fury of aerial bombardment.

To support the drive of Australian and American troops across New Guinea to the Buna and Gona beach-heads during November and December, 1942, all available Australian civil aircraft were commandeered and set to work in the forward areas.

At a most vital period just prior to the big New Guinea offensive, a number of Douglas and Lockheed aircraft were made available to Australian civil air operators, and after the necessary conversions, these too were pressed into service. Known as "bully beef bombers," they supplemented the military air trains, dropping supplies on strips and clearings well within range of the enemy's guns, running the gauntlet of his fighters as often as five times each day.

General Kenney, at that time in command of the U.S.A.A.F., was most impressed with the work carried out by the Australian civil pilots and ground staff, and their determination to get the supplies forward, and wrote his appreciation in personal letters to the men concerned.

"Qantas" records show that the company's machines and personnel were responsible for the carriage of 121 tons of urgently needed stores and equipment across the dreaded Owen Stanley Ranges during the vital period.

Much of the war history of Qantas Empire Airways is contained in "Frontline Airline," an authentic historical record by E. Bennett-Bremner, a member of the company's publicity department. The book has been published both in Australia and in England.

EPIC OF THE INDIAN OCEAN CATALINAS

The experience of long-range ocean flying during the Pacific deliveries of Catalinas for R.A.A.F., was one of the main factors responsible for the plan to reforge the Em-

pire link with the outside world. One of the deliveries had been flown from Canton Island direct to Sydney, a distance of 3,200 miles, with the greatest of ease, and it seemed possible that the type would fulfil most of the requirements necessary for the 3,513 miles non-stop haul across the Indian Ocean.

The project was put to the Governments, but quite a lot of opposition had to be overcome before full agreement was reached, and Q.E.A. were asked to operate a service for B.O.A.C. with Catalinas loaned by the British Government.

Survey flights of a preliminary nature were made by an R.A.F. Catalina Squadron during May, 1943, and on July 10th, the first regular weekly service made the crossing from Ceylon to Perth. The frequency was increased to thrice fortnightly and later, augmented by two Liberator aircraft, became firmly established on a twice-weekly operation.

The operation was beset with hazards not normally encountered in peace-time. It involved the world's longest regular non-stop flight, and had to be made in complete radio silence. Because of this, meteorological data was difficult to obtain, and a system of long-range weather forecasting had to be introduced.

The high fuel weights permitted only very few passengers. The payloads were never much above 1,000 to 1,200 pounds, but with airgraph and the air-letter flimsy, the service provided a reliable and rapid connection between the Commonwealth and Great Britain, and was later extended to Karachi.

While the Catalinas were in operation, a period of just over two years, they made 270 crossings carrying 113,760 lbs. of official documents and mails, 14,383 lbs. of freight and 648 high priority passengers. Including test and delivery flights, a total of over one million miles was reached in the two years during which the Catalinas operated.

The Catalina was designed for a normal "all-up" weight of 27,000 lbs., but to accommodate the heavy load of fuel to make the Indian Ocean flight possible, it was necessary for us to operate our fleet of Catalinas to 35,150 lbs. to carry an average payload of 1,000 lbs.

These aircraft were therefore overloaded to the extent of approximately four tons at the beginning of each flight.

Special limitations were placed on the operation of these services, and flights from Perth and Ceylon were postponed when severe turbulence was indicated in the flight forecast, or conditions of rough water in the wide Swan River were experienced.

The meteorologists who prepared forecasts for these services were particularly asked to state the degree of turbulence that might be anticipated in the first ten hours of the journey. On several occasions the passage of weather fronts on the Perth end of the route necessitated deviations from course when the aircraft were heavily loaded, or postponement of the flight.

Any sea conditions worse than "Sea Slight" were avoided as rough water placed heavy strain on the aircraft hull and structure generally.

After ten hours' flight, the fuel consumed reduced the all-up weight to that which gave single-engine performance, and the full safety margin in rough weather.

To safeguard the aircraft over this period, dump valves were fitted so as to jettison fuel quickly in the event of emergency. These valves were used effectively on a few necessary occasions.

The normal fuel tankage of the Catalina is 1,460 imperial gallons which is contained in the main plane above the centre section. For the Indian Ocean Catalinas eight extra tanks were installed in the engineers' compartment, which contained 66 imperial gallons each, making a total of 1,988 imperial gallons in the aircraft when ready for departure.

The weight of the fuel in the tanks at the time of take-off was 14,300 lbs. (nearly

7 tons), and it is interesting to note that the Catalina weighed approximately 6 tons lighter when it arrived at its destination as compared with its weight when it set off for the flight.

A special technique was developed by our Captains for effecting the take-off with such a heavy gross weight, in the shortest possible time—seconds counted—and it was found that in the very early stages of getting the ships "up on the step" considerable time could be saved by careful handling.

At the normal "all-up" weight of 27,000 lbs. the Catalina will take-off in 37 seconds. After some practice, the Q.E.A. pilots executed a normal take-off, with a light breeze of about 5 miles an hour, in 55 seconds to 1 minute when weighed down to 35,000 lbs.

In glassy water conditions on the Lake at Koggala, Ceylon, with no wind, a take-off might exceed 100 seconds.

One of the most interesting features of this operation was a question of range, and much thought and study was given to obtaining the greatest number of air miles per gallon with the Catalina flying-boat.

The engine operation plan based on an average speed of 130 miles per hour gave an extreme range of 4,650 statute miles, or nearly 36 hours' flight duration.

When the flight forecasting and flight planning became more reliable, the cruising speeds were advanced by 5 to 10 miles per hour so as to shorten the journey.

This extreme range was obtained by progressively reducing power and flying to a constant air speed throughout the flight. As the aircraft become lighter so the power was reduced with the consequent lower fuel consumption per hour.

The average flight for Catalina services between Koggala and Perth was 27 hours and in the westerly direction, when advantage could be taken of the trade winds, flight time would average approximately 26 hours.

The longest flight was service No. 1Q8, which occupied 31 hours 50 minutes, and the shortest flight was done in the record time of 22½ hours at an average speed of 160 miles per hour, but this was aided by winds of exceptional force, and higher cruising speeds with favourable conditions.

On these long flights a crew of six were carried, which comprised a Captain and two Pilots, 1 Navigation Officer, 1 Radio Officer and 1 Flight Engineer.

The three pilots were interchangeable and could navigate as well as listen on the radio, which made a flight roster system feasible.

After departing on these flights, a printed roster showing the hours of duty for each member of the crew would be fixed on the ship's notice board and each member of the crew would rigidly adhere to his hours of duty.

This meant that each member of the crew could have at least six hours of rest during the complete flight.

The navigation of these flights is a particularly interesting feature, as for practically the whole time the Catalina service operated radio silence was strictly adhered to with the exception of areas close to either terminal.

Navigation was virtually carried out solely by Dead Reckoning and Astro-Navigation.

Dead Reckoning was accurately kept and wind information supplied in the weather forecasts checked by the three-course wind observation method. At night, flame floats were dropped to observe wind.

Navigators aimed to plot three-star fixes hourly to keep these aircraft flying on course at night.

During these operations three or four trips were especially made to Cocos Island, and these small Islands were found after a long flight from Perth or Ceylon, without any aid by radio whatsoever.

The method adopted by our Captains to locate these Islands was made by very careful planning and the final approach to the objective by "flying down a sun line."

The time of departure was fixed so that the aircraft would be in a position about 300 to 400 miles from Cocos Island at sunrise.

This position was pre-determined and aimed for so that the final approach could be made to the Island at right-angles to the sun's bearing. When the sun had reached an altitude of between 15 degrees and 20 degrees, a series of sights would be taken at various intervals and plotted on the chart. With the track of the aircraft parallel to the position line obtained from the sun, location of the Island was quite straightforward, provided the sun was not obscured by clouds.

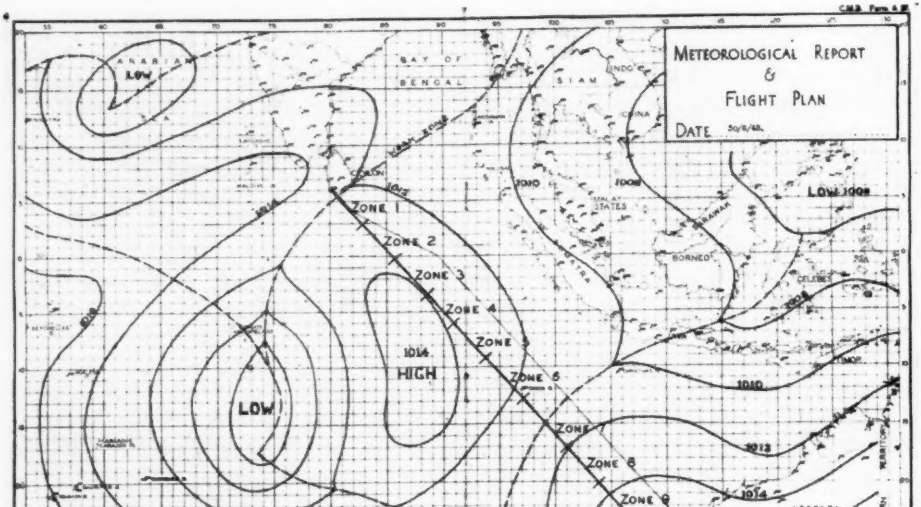
While this method of locating a small objective in an ocean is known to all navigators, it is a most interesting procedure and particularly successful.

On one occasion while one of the Q.E.A. Catalinas was moored at Cocos Island, a Japanese reconnaissance plane flew over and dropped one bomb which landed in the water some fifty yards from the aircraft, causing no damage.

The reliability of the Pratt and Whitney engines installed in the Catalina contributed greatly to the success of this service. They were overhauled at Kalgoorlie, and changed at the Company's maintenance base at Nedlands on the Swan River at Perth.

Over two years of operation there were a few engine failures. These were chiefly due to ignition troubles where aircraft were stopping over at Ceylon and moored on the Lake at Koggala in most humid conditions with a deteriorating effect; to piston failure, and one case of a cylinder becoming slightly dislodged.

Most of these defects were discovered on test flights, but on one occasion an East-bound service landed at Geraldton, 200 miles



A Qantas Meteorological Report and Flight Plan for the Indian Ocean route.

north of Perth, having flown the last 890 miles on one engine due to cylinder trouble. On another occasion, a forced landing was made at night at Cocos Island due to magneto trouble.

As each flight occupied an average time of 27 hours, passengers were presented with souvenir certificates admitting them to membership of " The Rare and Secret Order of the Double Sunrise."

One of the most welcome passengers to cross the Indian Ocean was Lord Knollys, Chairman of British Overseas Airways, who, in company with Mr. Campbell-Orde, took over 28 hours for the crossing.

I am sure one of the great secrets of Lord Knollys' undoubted success is his great enthusiasm and willingness to go out and see for himself and share in the risks and the ups and downs of B.O.A.C. and their associates.

Crews operating on the Indian Ocean service became entitled to wear a small gold star above their wings after making four return crossings between Perth and Ceylon.

It is interesting to note that some of the motors used in the Catalinas were entirely Australian-built—Pratt and Whitney twin-rows built under licence by the Commonwealth Aircraft Corporation at Fishermen's Bend near Melbourne. The faith of the crews in these products of Australian workmanship was of the highest and the records show that delays and mishaps due to engine troubles were at a remarkable minimum.

The small payload of the Catalinas was a limiting factor on the amount of traffic which was offering on the Service and after a year of operation, two Liberator aircraft were made available to supplement the Catalinas.

These machines for the shorter 3,077-mile hop, had a payload of 5,500 lbs. including 15 passengers, which was a splendid performance. It was expected that the 2,000th passenger would be carried across the Indian Ocean during September, 1945.

The Liberators make the crossing in approximately 17 hours and the operation has become known as the " Kangaroo service." A flight certificate which elevates passengers to " The Order of the Longest Hop " is much sought after by passengers.

It is fitting that this vast stretch of ocean was conquered by the same mutual alliance responsible for the overthrow of the Axis might in the Pacific. An association of British and Australian flying interests, backed with the best of America's available aircraft, proved superior to the onslaughts of wind and weather in one of the toughest tasks yet to be attempted in regular airline operations. That the products of Consolidated-Vultee were more than equal to the most rigorous demands is proven.

A fitting tribute should also be paid to the teamwork of the crews and ground staff responsible for the maintenance of the schedule, to Australian workmanship, to the R.A.A.F. and the various branches of the Department of Civil Aviation, the value of whose unstinting co-operation and assistance has been incalculable.

Cumulative figures for the Indian Ocean service since the commencement of the operation until 31st March, 1945, are shown below:—

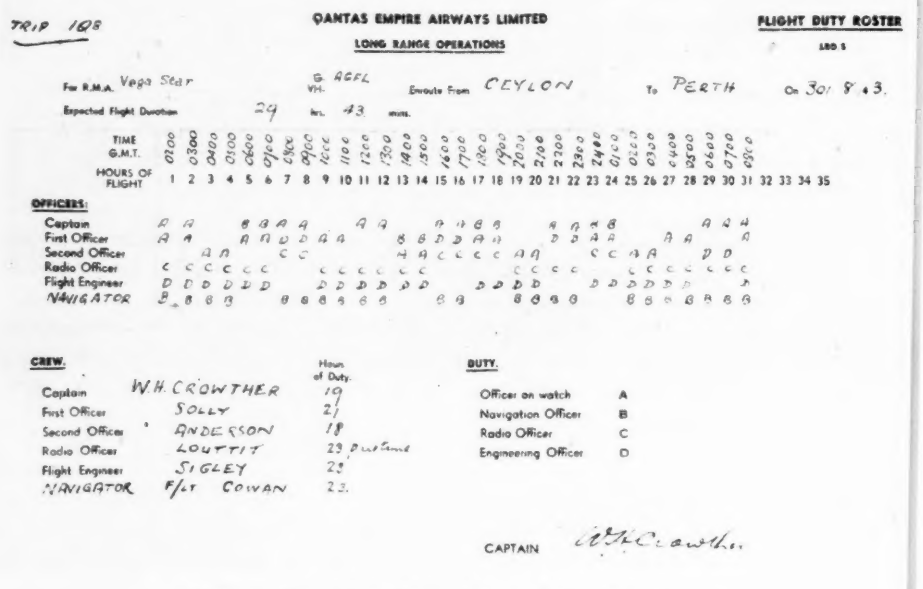
Miles Flown :		
Catalina	1,185,571	miles
Liberator	434,976	,,
Passengers :		
Catalina	524	,,
Liberator	1,010	,,
Freight and Baggage :		
Catalina	64,082	lbs.
Liberator	128,842	,,
Mails :		
Catalina	153,884	,,
Liberator	122,653	,,
% Load Factor :		
Catalina	65.925	%
Liberator	76.021	,,
Trips Scheduled :		
Catalina	235	
Liberator	115	

Trips completed :

Catalina	...	...	223
Liberator	...	...	103

PREPARING FOR POST-WAR INTERNATIONAL AIR TRANSPORT

Now the end of the war could be seen drawing near and with it the recommencement of Civil Air Transport operations. During the war the U.S.A. had kept her main civil operating organizations in existence doing a job inside America, while


TRIP 108

QANTAS EMPIRE AIRWAYS LIMITED

LONG RANGE OPERATIONS

FLIGHT DUTY ROSTER

For R.M.A. Vega Star — G. AEFL VH- — Enroute From CEYLON — To PERTH — On 30/8/43.

Expected Flight Duration 29 hrs. 43 mins.

TIME G.M.T. 0100 0300 0400 0500 0600 0700 0800 0900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000 2100 2200 2300 2400 0100 0200 0300 0400 0500 0600 0700 0800

HOURS OF FLIGHT 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35

OFFICERS:

Captain
First Officer
Second Officer
Radio Officer
Flight Engineer
NAVIGATOR

CREW.

		Hours of Duty.
Captain	W.H. CROWTHER	19
First Officer	SOLLY	21
Second Officer	ANDERSSON	18
Radio Officer	LOUTTIT	23 Duplicate
Flight Engineer	SIGLEY	23
NAVIGATOR	F/Lt COWAN	23.

DUTY.

Officer on watch	A
Navigation Officer	B
Radio Officer	C
Engineering Officer	D

CAPTAIN W.H. Crowther.

A Qantas Flight Duty Roster for the Indian Ocean route.

Pan American Airways, American Export and T.W.A. in conjunction with the Army and Navy kept in the picture on the airways of the world transporting men, munitions and materials.

In the United Kingdom, B.O.A.C. had been kept alive exclusively in the service of the war effort, civil air transport inside the United Kingdom vanishing almost altogether. In Australia, the internal airlines had kept operating, first satisfying Government priority traffic, and overseas, Q.E.A. carried on conveying war traffic entirely.

About this time it was seen that something had to be done to augment the Liberator and Catalina Indian Ocean Services, and specially as the British Navy was preparing to take a much greater part in operations in the Far East and to a great extent based on Sydney. Thus it came about that the Lancastrian Service was planned and put into operation, the first service arriving in Sydney on 4th June, 1945. The scheduled time from Hurn to Sydney is but 63 hours for the 12,038 miles journey, which is an average speed of 221.9 m.p.h. flying time or 191 m.p.h. total elapsed time, including all stops. This is against about 57 m.p.h. averaged on the Empire Flying-Boat Service when they used to tie up at night.

With the Lancastrian Service a new era of speed in British Air Transport was ushered in and for which the credit largely goes to General Critchley, Director-General of

B.O.A.C., who has fully recognized the need to exploit the great intrinsic value inherent in the aeroplane, the value of speed. It is speed which the public values and pays for, and if ships and railway trains do not tie up for the night when darkness falls, why should transport aeroplanes?

Russia too has a network of Services inside her own vast country and it was in view of the positive need to secure agreement between the Great Air Transport Powers before post war overseas air transport could really begin that the United States suggested the Chicago Conference which you all know the history of so well.

Actually Chicago did splendid work in laying the foundations of agreement on technical matters, and even if it did leave International operation much in the air, it allowed a vital initial ventilation of views based on the famous Five Freedoms, which are as follows:—

"Each contracting State grants to the other contracting States the following freedoms of the air in respect of scheduled international air services:

1. The privilege to fly across its territory without landing;
2. The privilege to land for non-traffic purposes;
3. The privilege to put down passengers, mail and cargo taken on in the territory of the State whose nationality the aircraft possesses;
4. The privilege to take on passengers, mail and cargo destined for the territory of the State whose nationality the aircraft possesses;
5. The privilege to take on passengers, mail and cargo destined for the territory of any other contracting State and the privilege to put down passengers, mail and cargo coming from any such territory.

"With respect to the privileges specified under paragraphs (3), (4) and (5) of this section, the undertaking of each contracting State relates only to through services *on a route constituting a reasonably direct line out from and back to the homeland of the State whose nationality the aircraft possesses.*

"The privilege of this section shall not be applicable with respect to airports utilized for military purposes to the exclusion of any scheduled international air services. In areas of active hositlities or of military occupation, and in time of war along the supply routes leading to such areas, the exercise of such privileges shall be subject to the approval of the competent military authorities."

Also out of the Chicago Conference came the Provisional International Civil Aviation Organization (P.I.C.A.O.) charged with continuing to work on the problems involved, and which will centre greatly round the Five Freedoms which are not universally agreed with the exception of (1) and (2). A new International Air Transport Association (I.A.T.A.) was formed as an operators' forum, and should work well in a complementary way to P.I.C.A.O.

Then, because we British are a scattered people with the extraordinary Empire Constitution which we have, we needs must have our own Empire Forum, which consists of the Commonwealth Air Transport Council (C.A.T.C.) and, working with it, the Commonwealth Air Transport Operators' Committee (C.A.T.O.C.).

These four organizations, and their numerous sub-committees, in which we are so interested, have made very good starts. There is going to be a great deal of talk in the future and, on the principle that it is better to talk than to fight, this is a very good thing. The thing is, we have got to keep right on talking and get everybody in and keep them in, and keep them talking and not fighting. We must profit by the mistakes of the immediate post-war I period. and the peaceable peoples must remain strong and united to enforce peace.

SOME OF THE PROBLEMS

I think every member of these organizations should read and study Lewis Mumford's two books, "Technics and Civilisation," and the "Condition of Man." Here are two quotations:—

> "To-day our best plans miscarry because they are in the hands of people who have undergone no inner growth. Most of these people have shrunk from facing the world crisis and they have no notion of the manner in which they themselves have helped to bring it about. Into every new situation they carry only a fossilised self. Their hidden prejudices, their glib hopes, their archaic desires and automatisms—usually couched in the language of assertive modernity—recall those of the Greeks in the fourth century B.C. or those of the Romans in the fourth century A.D. They are in a power dive and their controls have frozen. By closing their eyes they think they can avoid a crash.
>
> "The physical victory over the barbarian in war is no answer to the problem that the barbarous existence has conjured up, it merely clears the way for an answer."

That's it! The way has been cleared for an answer, and every one in these new International and Commonwealth Air Organizations has a tremendous responsibility. It must be a part in friendship, toleration, and human relationships rather than the suicidal national aggressive tactics of the past. No longer can *anyone* stand alone.

With these things in view, it does seem that the extraordinary and incomprehensible organization, the British Empire, has got to be kept going. No man of good will would want to see it break up at this critical time, seeing what the British can contribute and can do when strong enough. What are the British Isles without the Dominions? And what would their contribution to the future be, alone? What does Australia amount to without the U.K.? What Texas would be without the U.S.A. or the Ukraine would be without Russia.

It is clear then, that in these post-war days, if we are to win the peace, co-operation is an essential and this is particularly true of Air Transport. Australia then will play her part as a unit of Empire and will be one of those on whom will fall the task of assisting to work out and put into execution an International plan for post-war overseas Air Transport which will enable the great new way of the air to go forward in peace and prosperity and be used for the good of the people of the world, and not as the shadow of a coming evil greater than we have known before.

As the American high pressure advertisements put it, "no spot on earth is more than 60 hours from your local airport." Sydney and Melbourne are but 24 hours by air from the two greatest centres of population in the world, China and India. In our day these times will be halved. This brings a realization of what a small place the world is really becoming; how it is shrinking all the time and the Nations of the world being thrown into each other's pockets with all their wonderful new toys to play with, and without the necessary education of how to use them for the common good.

Overseas Air Transport is dynamite! and it must be as strictly guarded and handled as that dangerous but very useful commodity is, right from its manufacture, requiring permit to buy, and licence to use.

Surely the first great requisite for safety is for the British to agree and then collaborate with the U.S.A. fearlessly to face the facts and get down to an honest stabilised job for the good of the people as a whole as opposed to the success and glory of an individual or small group of individuals.

How true Lawrence of Arabia was when he wrote:—

> "The conquest of the last element, the air, seems to me the only major task of our generation, and I have convinced my-

self that progress to-day is made not by a single genius but by the united effort."

AUSTRALIA STATES AN IDEAL

The ideal that must be worked for is that put forward in the joint Australian-New Zealand proposals at the Chicago Conference and ably put forward by Mr. Arthur S. Drakeford, the Australian Minister for Air, and Mr. D. G. Sullivan, the New Zealand Minister for Industries, Commerce and Supplies.

"Being determined that the fullest measure of co-operation should be secured in the development of air transport services between the Nations of the world

"Believing that the unregulated development of air transport can only lead to misunderstanding and rivalries between Nations.

"Being convinced that air transport can and should be utilised as a powerful instrument in the cause of international security and in the attainment of 'Freedom from Fear' as embodied in the Atlantic Charter.

"Believing that the interests of all Nations, both large and small, can best be advanced by the joint utilisation of the material, technical and operational resources of all countries for the development of air transport.

"Believing that the creation of an effective economic and nondiscriminatory instrument responsible for the ownership and operation of air transport services between Nations of the world is in the best interests of orderly world progress.

"AGREE that these objectives can best be achieved by the establishment of an international air transport authority which would be responsible for the operation of air services on prescribed international trunk routes and which would own the aircraft and ancillary equipment employed on these routes; it being understood that each Nation would retain the right to conduct all air transport services within its own national jurisdiction, including its own contiguous territories subject only to agreed international requirements regarding landing and transit rights, safety facilities, etc., to which end it is desirable that this Committee of the Conference should consider the organisation and machinery necessary for the implementation of this resolution."

How far we can travel along this Utopian road in the measure of co-operation securable to-day, will decide the span of peace which lies ahead.

Considering the pitfalls which will exist in competitive International Air Transport operation by the Nations and the great potential power for good or for evil which will be unleashed and could overflow all the National boundaries to the four corners, the ideal, the Utopia, is, of course, not only International control but International operation, because you can't truly have one without the other. It might be said in reply that we had no International control of shipping, but the palmy days of shipping were also the best days of Nationalism and ships only commanded the oceans. The aeroplane henceforth commands the world of both sea, land and air.

As Sir George Cayley, the "Father of British Aeronautics," said of the air over 100 years ago:—

"An uninterrupted navigable ocean that comes to the threshold of every man's door ought not to be neglected as a source of human gratification and advantage."

How can all of us utilize that great "navigable ocean" to the common good?

I think it is not a personal opinion but axiomatic to say that man will only become friendly over a lasting period when we are bound together by one economic organization, and not separated by different and warring economic set ups which create and maintain different standards where the advancement of one is at the expense of the others.

Australia's attitude is, therefore, one of realism in the midst of hoped-for and worked-for idealism.

The late Earl Grey seemed to strike the right note when he said:

> "What is wanted in politics is an idealist who can estimate rightly the limits of what is possible in his generation."

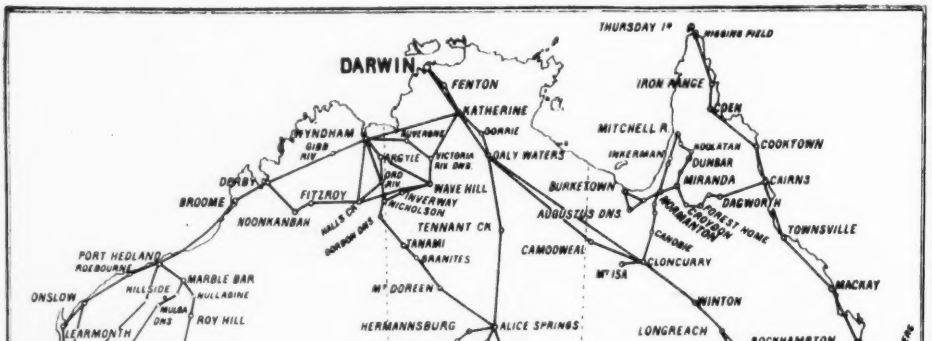
And we shall play our part in attempting to secure ordered International co-operation and peace in the air by our membership of P.I.C.A.O. and also of I.A.T.A.

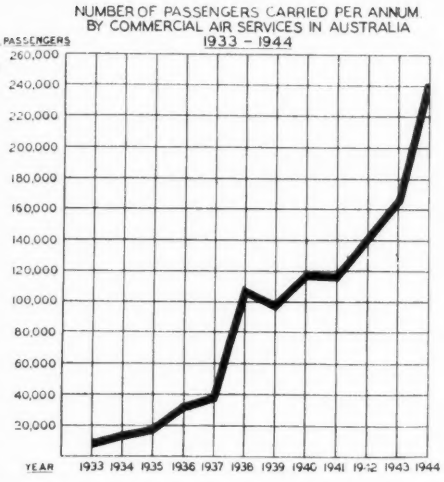
It is expected that Sydney, Australia, will become one of the Regional Centres of I.A.T.A. where local considerations of the region can be gone into and agreement reached.

There should be three British Overseas Services in and out of Sydney, the International Airport of Australia. Then no doubt our old friends, the Dutch of the K.L.M.-K.N.I.L.M. Services, will be back operating under International agreement; also the chosen instrument of the U.S.A. Government, no doubt Pan-American Airways; French and Portuguese interests also lie in the islands in the vicinity of Australia.

The justification of our work—the advancement of Air Transportation—is expressed in this quotation by St. John Ervine:—

> "For if all the acts at the end of 10,000 years are no better than they are at the beginning what object is there in the con-





tinuance of life for so long a time? Merely to repeat the accomplishment of another age is a poor excuse for existing."

In the past the word "accomplishment" has been given a fictitious value by the public and it is to a revaluation of the word which we must look if we are to have hope. A revaluation which will give medals and honours to those who assist peace and agreement.

AUSTRALIA FACES THE POST-WAR ERA

Here I think we should pause and consider where we stand at present in Australian Air Transport, ready to jump off into post-war activities. We have had a tremendous lot of background and historical matter to wade through but what you are most interested in, I take it, is what Australia is preparing to do in the future and what we are thinking.

Actually we are at a most interesting stage in our development. After a period of world leadership by our pioneers and by early Civil Aviation and Air Transport endeavour ("Qantas" is the second oldest operating Air Transport Company in the world), we find ourselves being severely challenged by our lack of population and wealth, in fact by under industrialisation—we are being challenged by the machine age! The answer, strictly within the next decade or so, lies in the will of the people, and in our Political leaders.

There are only two main classes of Air Transport in Australia, one Internal and Domestic, and the other Overseas, Empire and International. However, for the purposes of examination, I am splitting them up into the following categories:—

1. Internal Domestic Services.
2. Home Waters Services.
3. Australia - New Zealand inter-Dominion Services.
4. Overseas Services.

INTERNAL AND DOMESTIC SERVICES

For the year ending 31st December, 1944, the following figures were realised under this category:—

Miles flown	10,614,250
Passengers carried	241,863
Freight carried	1,729.7 tons
Mail carried	2,437,858 ton-miles
Number of aircraft in operation	48
Miles of route open	22,544

The map of Australia shown illustrates how Australia is covered with Civil Airlines, most of the routes operating to capacity, but carrying war loadings in one form or another. Money has been no object in war-time and the Airlines have had a prosperous and easy time, only vying with each other to see who could procure most Government business and get into favourable positions for post-war operations, which is all very laudable and resulted in smart competition and good service.

In the immediate post-war period, a continuance of the present level of traffic is mainly dependent on the level of prosperity and availability of travel money among the people of Australia.

Of the lines you will see on the map, only the Brisbane - Sydney - Melbourne-Adelaide-Perth trunk routes serve considerable centres of population. Perth could be eliminated from this category if it were not for its isolation which makes air travel connection with the other States necessary.

Australian National Airways, the instrument of the Shipping Companies, is the principal internal operator and has most ambitious plans for the future, Commonwealth and State Government policy permitting.

The only plan for post-war operation which is readily available is that submitted by the ex-Director-General of Civil Aviation, Mr. A. B. Corbett, which is primarily based on postal requirements.

The plan provides as follows:—

(a) To provide ultimately 22 distribution centres each having a radius of approximately 300 miles, which results in any place in inhabitated Australian Mainland and Tasmania being within 300 miles of one of these 22 distribution centres.

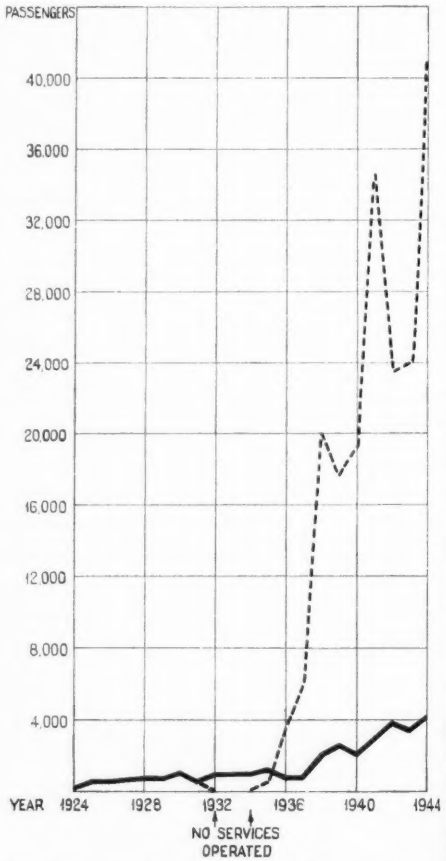
(b) Each distribution centre is located at the largest centre of population in its area, and each has an aerodrome.

(c) All first-class mails to be carried by air between these 22 centres to timetables to be determined. Each to have a minimum of one daily service and up to four or five times daily between the largest centres.

(d) The longest flying time between any two most distant centres would be $23\frac{1}{4}$ hours, *e.g.*, Perth, W.A., to Cooktown, Q'ld. The flying time between adjacent centres would be from 2 to 4 hours. An approximation of times between all centres is attached.

(e) The general idea is that mails despatched from any centre in Australia to any other centre would be flown in 24 hours or less, and as between most of the larger centres the time would be from 2 to 12 hours, *e.g.*, Adelaide-Brisbane $8\frac{3}{4}$ hours.

(f) The distribution from the 22 centres would be by surface transport, train, car or other means to a maximum of 300 miles or by small aircraft to sub-centres, say 100 miles flight, with further distribution by surface transport from such sub-centres.



Illustrating the flow of Air Traffic to centres of population.

——— Number of passengers carried on the Charleville-Cloncurry route (577 miles) serving isolated Queensland country towns with a total population of under 100,000. In 1930 route extended to Brisbane (population 350,000) capital of Queensland, adding 444 miles to route.

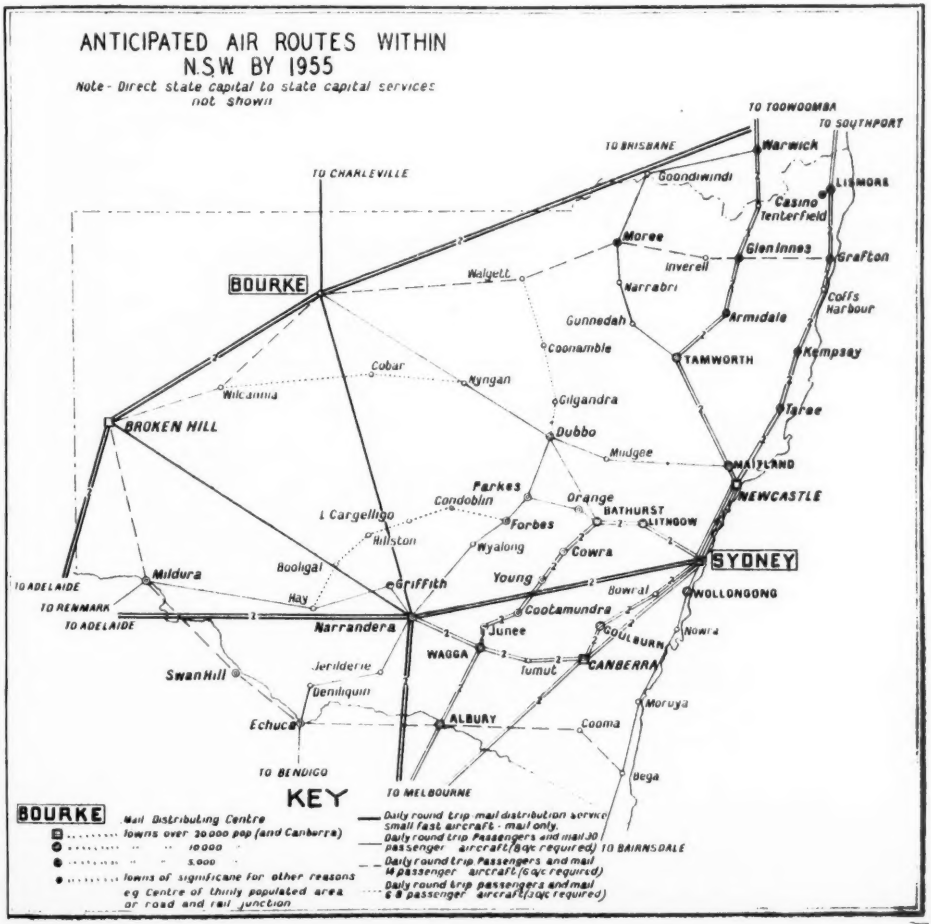
▪▪▪▪ Number of passengers carried between Sydney (population $1\frac{1}{4}$ million) and Melbourne (population 1 million).

(g) Portion of this proposal was originally suggested by Sir Harry Brown some years ago for distribution of first-class mails between capital cities only. That proposal therefore forms portion of this proposal, and possibly might be implemented as a first stage. But it would not provide the larger amount of scope for post-war reconstruction work as is included in the larger scheme, because the inter-capital city routes are already developed and equipped for operation.

(h) Mails would be flown by day or night timetables to meet mail requirements.

(i) On the heavy load routes between capital cities, for example, some 'planes would probably carry mails only in loads of two tons upwards. For this purpose, certain bomber type aircraft, if made available at a low cost, would seem to offer a use to which excess aircraft of this type could be put with advantage. The high load capacity and high speed would be an advantage. The operating cost would, however, be higher than for commercial types.

(j) On other routes both passengers and mails would be carried to mail timetables.



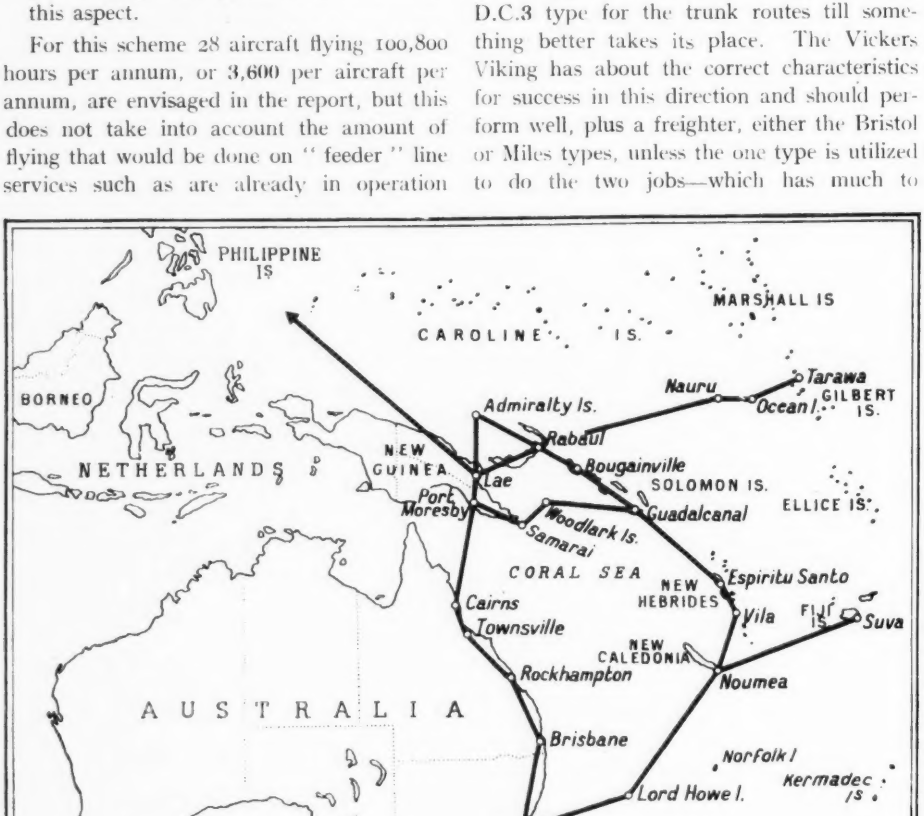
(k) Passenger 'planes would be provided as required where passenger timetables were not suitable to the mail timetables as a whole, but mails would also be carried as required on passenger planes.

(l) The carriage of air parcels post mails is intended to be included in the proposal and great importance is attached to this aspect.

For this scheme 28 aircraft flying 100,800 hours per annum, or 3,600 per aircraft per annum, are envisaged in the report, but this does not take into account the amount of flying that would be done on " feeder " line services such as are already in operation in a limited manner throughout Australia.

On feeder services, it is probable that 1,500 hours per annum per aircraft would be good going, and to take a round figure, say 28 aircraft, would be sufficient to start Australia off on her post-war feeder line services—or a total of 56 aircraft in all.

The types of aircraft envisaged are the D.C.3 type for the trunk routes till something better takes its place. The Vickers Viking has about the correct characteristics for success in this direction and should perform well, plus a freighter, either the Bristol or Miles types, unless the one type is utilized to do the two jobs—which has much to



recommend it for Australian conditions.

For the feeder line aircraft, the present Lockheed 10A's, Rapides and Dragons must be superseded by something round about the De Havilland Dove type.

The above is a very brief sketch of the immediate post-war period. Within five years there should be further great advancements doubling the number of aircraft in use. Within ten years, when entirely new and up-to-date designs embodying jet propulsion appear, and the short distance aircraft problem is solved, perhaps with the helicopter class, there is no telling what strides will be made. But they will be related firstly to the level of public prosperity, and, secondly, to an early solution of the present deadlock.

All aviation in Australia must come under the complete control of the Commonwealth or back we will go to the old State border customs days. However, the problem of Commonwealth or Private Enterprise competition with the State Railways must be solved first. If Australia is to keep her place as a first-class flying country, her air development must in no wise be hampered, and the States or the people as a whole must, by Referendum, hand over to the Australian Commonwealth the power to completely control all air transport operations within any State, as well as inter-state.

Should proper progress be made, in ten years, the populated parts of Australia should undoubtedly all be well covered by an aerial network. The incorporated map will show you how the State of N.S.W. would look when so developed.

Incidentally, it is hazarded, at the end of ten years, provided advancement is not unduly hampered, the greatest volume of air traffic between any two places within the State of N.S.W. should be between Sydney and Newcastle, 104 miles apart by rail and 78 miles by air.

HOME WATER SERVICES

To the lot of Australia must fall the responsibility of linking up those islands and territories around her shores which are economically linked with her. This will involve co-operation and in some respects co-ordinated action with New Zealand, the British Colonial Office and the French, Dutch and Portuguese Administrations, and by agreement where such is necessary.

The accompanying map shows the extent to which these services are likely to develop within the next few years.

Most of the areas have practically no white population at all, the whites in the whole of New Guinea before the war numbering under 5,000 and while there were 17,000 white French in Noumea there were less than 1,000 whites in the New Hebrides British French Condominium in 1942. Still these outposts must be served and for all its small population New Guinea has important gold fields and plantation activities.

For the Islands Services which would extend as far as Nauru and Ocean Islands, those most important superphosphate deposits, it is thought that amphibians would be most suited, and until something better makes its appearance, Catalinas or Catalina Amphibians would be the most favoured types. Long range and reliability are required, and robustness but not high speed, and very few aircraft indeed.

For the New Guinea Service, the D.C.3 type is at present in use, but could be well superseded by a four-engined type carrying about the same payload for a good range.

AUSTRALIA-NEW ZEALAND INTER-DOMINION SERVICES

This is, of course, a joint matter for the two Dominions and is likely to assume somewhat of a local aspect and could well be operated by a continuation of the successful Tasman Empire Airways now flying between Auckland and Sydney with Empire Flying-Boats.

The 1,400-mile journey occupies three days by ship and as modern aircraft can do

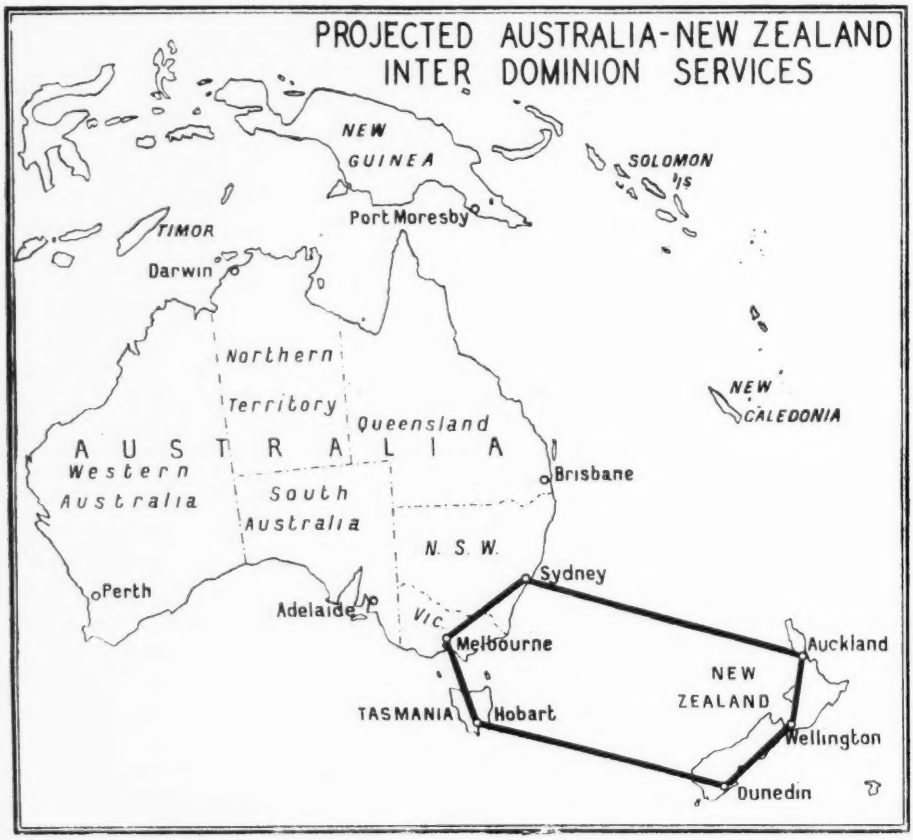
the trip in greater comfort to the average passenger in under seven hours, it seems that there is a big future in these inter-Australia-N.Z. airlines. They will probably operate as set out in the accompanying map.

Flying-Boats would be ideal for this service if comparable in economy and cruising speed to land aircraft, but on present indications for the next few years the most suitable type would be the A. V. Roe Tudor II or the Handley Page "Hermes."

A fleet of from two to three 40-passenger aircraft would carry all the traffic offering, initially establishing a daily service lifting about 30 passengers a day in each direction which would amount to 33⅓ per cent. of the pre-war shipping traffic.

OVERSEAS SERVICES

In a previous section it was made clear that for its overseas Air Transport the British Empire should stand together. Australia therefore faces the future as a unit of Empire, yet playing her own individual part and bearing her fair share.



The system of the operation of through parallel frequencies as between the U.K. and Australia has already been agreed on the England-Australia route via India, as it has already been agreed between the U.K. and India and South Africa. This system of operation allows for individuality of operation but retains the benefits of mutual aid and the pooling of revenue and some expenditures.

New Zealand is also in the picture but her main interest lies in the Pacific.

The vast predominance of traffic between these Empire points is Empire traffic. This applies particularly to mail and the agreements made are, therefore, right and proper agreements.

You will see then from the map the first route that Australia is interested in is the Australia-England route via India. It lies along the path of the Australian Air Pioneers, from Ross and Keith Smith onward, and over the old Empire Route established in 1934 when Australia operated the Brisbane-Singapore section with the specially built De Havilland 86 in which Q.E.A. pilots from December, 1934, to August, 1938, flew 2,681,000 miles without any accidents causing casualties, and flying the then dreaded 512-mile Timor sea, for a time without benefit of any guiding directional radio.

The Lancastrian service at present does the Hurn-Sydney run in 62 hours, or in the same time that it took the England-Australia Empire Flying-Boat service to get as far as Cairo in 1939.

In 1946, it is planned to put Tudor II aircraft on this service with Australian frequencies going right through to Hurn, and U.K. frequencies going to Sydney, with possible extension to New Zealand.

These England-Australia services via India are mainly serving Empire territories and carrying British traffic. They will be developed as the main Empire Trunk Route with considerable importance for the future and the probable operation of more than one class of service, if post-war economic conditions allow traffic to develop freely.

The second route of importance is the line from Canada to Australasia which is to be operated jointly by Canada, and a joint U.K.-Australia-N.Z. organization operating parallel through frequencies.

In this route, the United States of America has a great interest, not only on account of the U.S.A. traffic involved, but because of territorial considerations. The British route must run via U.S.A. soil, and the U.S.A. line, when it comes to Australia, must also use British soil and tap British traffic so that there are grounds for good reciprocal arrangements here.

In addition, the U.S.A. now has a great interest in the Pacific from a future defence point of view, and will be obliged to assume added territorial responsibility as opposed to purely commercial interests.

Australia, which lived under the shadow of a great horror, was saved by the U.S.A. Just as surely as you, alone, won the Battle of Britain and saved us all, so did the U.S.A. and her splendid Navy save Australia from Japanese conquest and occupation and the death and destruction which would have followed. Many of us do not feel we would have been here to-day but for Uncle Sam's Navy, and Australia will always be grateful.

Aircraft for this Pacific route will probably be either the Canadian-built D.C.4 with Merlin engines or the Tudor II.

The third overseas route in which Australia is interested is, fairly obviously, an extension of the present Sydney-New Guinea service to China and Japan. When such a service could begin depends on conditions as they emerge after the post-war clean-up now in progress, and on International agreement. The type of aircraft, frequency of service and so on would again depend on friendly post-war trade and other conditions as between Australia and the Far East, and on the general level of prosperity.

BRITISH AIR TRANSPORT

In discussing the question of future overseas Air Transport operation with members of the public and, in fact, with leaders of our leading industries and public activities, it is amazing how many of them still look on the air as something quite different, and in fact miraculous. And in its operation and general implications for the National good as if it were in a make-believe world of its own where the ordinary laws of industry, trade and economics do not apply.

There has also been a public sensitiveness in regard to International rivalry, which at times extended to the Press. A sensitiveness which not only criticized our own British deficiencies (which was all to the good), but often actively supported the other fellow to the detriment of the progress of our own.

The answer to this is to ask such critics to apply exactly the same kind of criticism to their own business and in managing it be subjected to free and open International competition. You can be fairly sure that the industry of the critic will, in seven cases or more out of the ten, be well protected against foreign competition.

Air Transport, internal or overseas, is a distinct National industry. The success or failure of Australia's overseas aviation effort will be the Country's gain or loss in the future and one of the main factors, taking the Empire as a whole, in deciding the fate of our whole aviation industry in the future, from manufacturing upwards.

The operation of aircraft is just such a normal business as telegraph and wireless communications, as railways and shipping, and our whole economic future depends on the support of our own in these things, unless we first decide on some International merger which will pool, gain or loss. It can also be said that in these industries, as in air transport, comparative International efficiency varies, but rarely sufficiently to cause the temporarily under-privileged to change their customs.

So it is quite clear that for the good health of our future we have got to be just as thoroughly British about our air effort as the Americans are American and the Russians Russian. But in the long count excellence is the only final test and any deficiencies which exist now, must be made good or we cannot expect to maintain that leadership which the British aircraft and engine manufacturers made possible during the war in the supply of war needs, and which must now be turned towards the urgent succour of the Country's civil peace effort. It can only be done by the Government giving your Manufacturers, your Planners, and Designers and your National Operators the real go-ahead signal.

And so it seems that the fact does have to be faced that, apparently, Australian and British interests have got to fight for their lives or be overwhelmed by the U.S.A. by sheer weight of industrialism, numbers, circumstance and the brilliant Air Transport organization built up both before and during the war.

The Press tells us that La Guardia, New York's civil airport, has just broken its previous record with over 500 arrivals and departures during a 24-hour period. The truth is that the U.S.A. in its own inviolate right, in its own great country, run by its own 130,000,000 go-ahead people, has the greatest airways system in the world, carrying the world's greatest and most highly organized air traffic.

The British have no possible development comparable to this, unless we turn to traffic within the Empire units. It does seem that we have some right to retain this amply and we need it for our life, as the U.S.A. needs her internal traffic.

Here are the figures for passenger arrivals and departures to and from Australia and the U.S.A. and other parts of the British Empire for the year 1938:—

	To Australia	From Australia
Between Australia and		
Great Britain ...	14,732	15,041
U.S.A.	3,780	3,003
Canada	2,042	1,087
Straits Settlements	2,397	2,550
Hong Kong ...	2,185	1,148
India and Ceylon ...	3,341	2,777
New Zealand ...	29,927	29,419
New Guinea ...	2,081	2,034
South Africa ...	1,578	1,767

Is there a case for some kind of inter-Empire cabotage air traffic to allow us to continue to serve the far scattered parts of the Empire, and as undoubtedly the only means of continuing our great responsibility into the post-war world, post-war rehabilitation and stabilisation period which we are now entering?

I think there is; but we must both secure and deserve the right to retain this vital inter-Empire air development or others must soon take over our vast territorial responsibilities and liabilities, unique in the world today.

One might well ask what interests are being served in such movements. The interests of peace and stability for the future? The interests of exploitation, large or small? Or the interest of some personal overweening ambition? We must see that the first prevails.

AUSTRALIA AS AN AIRCRAFT MARKET

When war broke out with Germany in 1939 there were 125 registered private owner aircraft in Australia, plus about 59 Club machines—a total of some 184 light aircraft.

Most of the aircraft are gone or are obsolete now, and after perhaps a small post-war spurt in 1946, it seems that some considerable time must elapse before any real progress is made. This will principally be owing to the lack of suitable aircraft, but also because of high first cost and operating costs, coupled with the heavy present day cost of living, including taxation.

Undoubtedly the really acceptable private owner 'plane has not yet made its appearance, and it is doubted if it will do so before jet or the gas turbine are economically utilized.

Privately operated aircraft would sell in some numbers in Australia provided the following points can receive attention:

The aircraft should be practicable for all-weather operation in near foolproof safety; carry a near "motor car" load at near "motor car" first and operating cost, and over yearly mileage much smaller than those realized by air transports; and provide a robustness of airframe and power plant requiring a small part only of the maintenance of the 1939 light aeroplane.

A tall order perhaps, but no doubt it will

be done. Such a new type would also make learning to fly both popular and cheap, and would occasion a great increase in School flying for sport.

Ground Services development in Australia has been in the hands of the Civil Aviation Department, of which Mr. D. McVey is the Director-General, and Captain E. C. Johnston, D.F.C., the Assistant Director-General of Civil Aviation. Very good progress has been made, and Australia, with her 29,072 miles of operating air routes, is not backward.

A difficulty, however, has been to adequately cover the vast areas of Australia with the amount of annual funds made available by Parliament. Because of this lack, actual airport development in regard to buildings and amenities has been somewhat backward, though considerable progress is now forecast for the immediate post-war years. Provided that our Government fully recognizes the importance of Civil Aviation Australia's post-war airways, airport and communications development, we hope, is assured of being up-to-date.

It is expected that Mascot Aerodrome, Sydney, will be the International Airport of Australia, and as such, it is hoped will be highly developed and have proper fast connection by underground with the centre of the city. Development of extensive underground workings will, no doubt, be an essential feature for the future planning of development work in the structure of all big cities.

Only profitless-enlightened peoples who are capable of breaking away from tradition and who can gauge the future well are likely to survive as first-class Air Transport operating powers. Aircraft and ground organization are the basis for all success.

To-day, by Air Transport, Australia is brought within the same transit time distance of England as that between London and Edinburgh 150 years ago. Because of this new proximity, and also because of the need for a measure of Empire decentralisation—and the lengths to which this has already been taken in industry and manufacture in Australia—the manufacture of aircraft in Australia seems a logical and practical step.

Indeed, it is a step which had been firmly embarked on during the war, the main seat of the new industry being at Fishermen's Bend, Melbourne, the home of the Commonwealth Aircraft Industry. General Motors have also come into the picture as well as the De Havilland Aircraft Pty., Ltd., in Sydney which has been turning out Dragons and the famous Mosquito. During the war approximately the following aircraft and engines were turned out in Australia:—

D.A.P. (Beaufort Division, represents 80% of total Australian production on tons weight of aircraft.)

700 Beauforts
330 Beaufighters

De Havilland Aircraft Pty., Ltd.

115 Mosquito M.XL. Fighter Bomber
87 DH.84A Dragon
1,070 Tiger Moth DH.42A
8 Gliders DHG.1

Commonwealth Aircraft Corporation

717 Wirraway
200 Wackett Trainer
250 Boomerang
18 Mustang

Commonwealth Aircraft Corporation

870 P. & W. Twin-Row Wasp
680 P. & W. Single-Row Wasp

General Motors Holden's, Ltd.

1,325 Gipsy Major aero-engines.

Actually most of the Pratt and Whitney twin-row Wasps which Q.E.A. were using on the 3,513-mile Indian Ocean run were completely made in Australia by Commonwealth Aircraft Corporation and performed extraordinarily well.

Australia can do the job, and now that the closest speedy touch can be maintained with the U.K. and America so that the interchange or forwarding of plans, urgent alterations, or even parts, is a matter of a few days only, there is no reason why Australia

should not hold her own in this essential sphere and build a portion of our Empire aircraft.

However, Australia would be wise to concentrate on a limited number of types and not be too discriminatory in regard to importations.

The Empire, if it is to keep going as such, must—in the vast majority of categories—use its own aircraft in just the same way as we use our own ships and steam locomotives, and on which are based our shipping and rail industries. And in just the same way as great Powers like the U.S.A. and, say, Russia use their own ships, steam locomotives and aircraft—it is basic.

On the other hand, the very basis of successful Air Transport operation lies in having the right equipment. The people who have the best equipment will operate the best airlines. It is, therefore, up to us to see that we have fully comparable equipment.

The two great qualities which will basically appeal to the public are speed and size. With, of course, the reasonable addition of the second inherent advantage of the aeroplane, frequency.

ENGLAND'S OPPORTUNITY

It is constantly said, "What a wonderful field Australia is for aviation." Granted up to a point, but with our small population of about 7,306,000 people spread over vast and uneconomic spaces, I often wonder if such remarks are as discerning as they should be, although aircraft show their greatest value when operated over long distances and poor surface communications. Actually, the greatest chances for exploitation by Air Transport in the future are not going to lie over the greatest distances but between the greatest centres of population, down to distances in many cases as short as 100 miles apart and less. This is a movement not a static fact, and to show its trend, I am showing a graph which explains this point in regard to air traffic in Australia from 1922 to 1945.

To further prove this, figures from Dr. Edward Warner's masterly Wilbur Wright Memorial Lecture of 1943 show that out of an estimated total number of main intercity air passengers carried in the U.S.A. for the year 1940, of 380,121 no less than 256,880 of them travelled between New York and Washington, New York and Boston, and New York and Philadelphia, respectively 214,184 and 95 miles distant.

In the future there must surely be an increased swing to the great centres of population as aircraft increase in efficiency and economy, as the necessary city airport facilities are created, and as the public increase their air-mindedness and not their taste for, but positive need for, fast travel to keep pace with the world around them.

The relentless law of happy and progressive existence demands that our neighbours' efforts be matched or social, living and other standards sink in relationship with our competitors in a world of competition, which means death.

If this reasoning is correct, then the greatest basis for the aircraft industry of the United Kingdom lies seemingly rather unsuspected and dormant right in your own midst.

Walking through Hyde Park for the first time since the guns and rocket batteries and huts were removed, the remaining unused big open space immediately caught my eye, as it would anyone interested in Air Transport development, and the future of England which must be so closely identified with air progress. I felt sure it could be developed into a central London aerodrome for short-stage British Isles aircraft and "helicopter" flights, and as the main centre for an essential chain of aerodromes grouped around central London. The only alternative seemed to be to roof in a strip of the Thames.

I submit that we are not planning for to-day, but for the world of to-morrow, and to live in that world. And that a master plan for airways communication inside the U.K. with special close-in airport facilities and one or two specially designed types of aircraft—

the aerial London buses of Great Britain—is an essential for that future.

This calls aloud to be done, and so get the people of England into the air in a big way. You can't have an airminded people without making actual air travellers out of them, which is good for their votes and good for the aircraft industry. Because without an airminded people you can't have enough airminded members of Parliament elected, and without a truly progressive airminded Parliament, you can't have an airminded England. And an airminded England is needed for survival of the industry and of England.

It all comes back to the supply of proper city airports plus design of special aircraft, plus making proper unfettered use of the two. Now is the time to do it, or live to look back in 25 years with great regret at a chance gone for ever.

" The public won't stand for it," you say, " a bit of Hyde Park—tut! tut!"

It seems to me that Britain at this juncture must make a great effort at leadership, and leadership and progress always seemed to take daring in the past. The public loss in one direction is their gain in another.

What about nuisances—now condoned—of your trains, motor cars, buses and trams, rendering the air hideous with sound, fumes, and smell, and disfiguring city and countryside?—and as I write the roar of motor traffic comes up from the street below, but half shut out by expensive acoustic window devices.

We cannot stop short and balk at the aeroplane and still lead.

W. A. Patterson, President of United Airlines, one of the soundest observers of Air Transport matters, in a survey of the future says:—

> " Within about 20 years . . . the airlines (in the U.S.A.) might be carrying . . . 40 per cent. of all express moved by rail, 33⅓ per cent. of railway, coach and inter-city bus travel, 80 per cent. of parcel post, 20 per cent. of rail ' less than carload freight '."

I would like to reiterate what I have so often said. That your greatest market is within and around your own country, and that it is essential for the future for a firm lead to be given in this, and what a splendid aircraft for export would be the aircraft solving the various weather and other problems necessary for your British Isles airways system. Some of the prejudices and misconceptions of the air have got to be overcome and the public made really interested.

One prejudice is " it costs more." Of course it does, just as it costs more to motor than to ride a bicycle. Actually the cheapest form of travel is to walk—that is if no value is placed on time. The cost of about everything is going up and money is being spent in different ways. A young man receiving a wage of £4 per week might easily spend £1 of it on entertainment of one form or another. What a long way we are ahead of the days before yesterday when the newspaper cost ½d., a good lunch could be had for 1/-, and our young man got a seat in the pit for 1/- and enjoyed the show, and got his 30/- or £2 per week!

Another misconception of flying is illustrated by the numerous friends who say " how exhausted you must be after flying from England to Sydney, Australia, in 62 hours." As a matter of fact, with the sleeping facilities aboard the Lancastrian it is much easier on the traveller to get there in under three days than it was in the old long-drawn-out nine days with the constant early rising and long fatiguing days of travel. So passengers of the future will also find it easier to travel from, say, Manchester to London by air in an hour and a half as against four or five hours in the train.

Those words " how dangerous it is " are being less and less heard and that great bugbear of early operations removed. It is up to manufacturers and operators to see that it is kept that way. The appalling number of people killed in aeroplanes by non-civil undertakings during the war and under war

conditions has left a bad taste in the mouth of the public.

Actually air travel safety figures are not yet as good as for rail or sea travel, but the toll of the road continues as an accepted part of motoring.

For the year 1938, Australian Internal and Overseas Services flew 43,053,184 passenger-miles for 25 casualties (23 killed and 2 injured). In the same year in Australia, 1,483 people were killed on the roads and 25,097 injured, though of course there were vastly more motor cars in use than aeroplanes.

THINGS TO COME

What does Australia want for the future? She wants to take her place as a unit of Empire and in world councils, to share in shaping the evolution of transport on which our civilisation rests—without place value there is no value in goods and services, and often in people themselves, and this is exemplified in the fuelless Europe of this winter.

We, therefore, look to increases in speeds, frequencies, safety and comfort, balanced and stabilised by economy.

That the future lies in the utilization of the gas turbine, jet, the rocket, and even newer sources of propulsion is certain. Also that mechanical flight can be made available whenever this is agreed Internationally. But if someone strong enough defies the International control on the type of flight agreed at Chicago—then some form of shooting will be the order of the day.

We can do nothing else but look on the development of mechanical flight *in the state the world to-day* with the greatest apprehension.

Lord Brabazon in a recent article issued a warning under the heading " Queer things happen in the heart of a mountain," from which the following is an extract:—

" Yet we have just discovered in Germany at Nordhausen an innocent looking ordinary mountain, showing no particular interest to anyone observing it from the air or any other quarter—yet that hill was a vast workshop.

" More than 20,000 people worked in it and never saw the light of day. Within that mountain were being built V2's and V3's and other more advanced rocket devices, as well as jet engines and aircraft."

Are these experiments and the development of atomic energy to go on or be resumed in the near future? If so, space flight can commence and our scientists will soon begin monkeying about with the moon, and someone either fly round it, land on it, or fire an atomic bomb at it, then the old moon voyage literature of Jules Verne, Wells and others will perhaps come to pass.

The only answer to these generally felt apprehensions can be in an arresting and careful control of these vast new powers while the world sits down and thinks. How wonderful if the world could take time off to think!

As Lewis Mumford debunks the position:—

" As for the migration and intermingling of peoples which marked the past age of land expansion, this must now take place on markedly different terms; the physical interchange of goods and travellers is not nearly so important as the process of cultural understanding and harmonisation. Those naïve souls who conceive world co-operation in terms of vast armadas of airplanes flying back and forth across the continents and seas, are secretly thinking of making the standards of Paris and Hollywood, New York and Moscow prevail throughout the planet; a bad dream, but only a dream, for if such a limited understanding prevails, its chief result will be further wars of extermination for the purpose of ensuring ' an American century ' or its British or Russian equivalent. Such mechanical intercourse would merely continue the irrational and irregional expansion of the past.

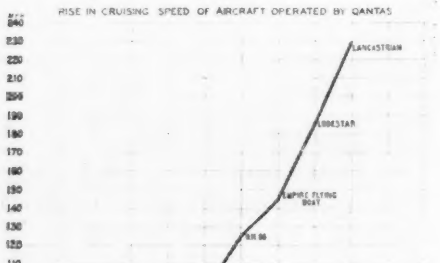
"Cultural intercourse demands a slow tempo of interchange and assimilation, the passage of goods is secondary to the interchange of ideas, values, and symbols; hence the leisurely comings and goings of students, artists, scientists, philosophers are more important than the quick journeys of high-pressured executives, coddling their will to power by their speedy appearance in person at different points."

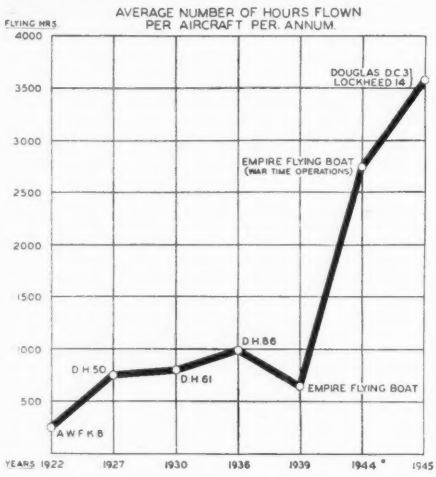
It is an amazing thing to look back from these thoughts of "co-operate or perish" which are uppermost in the minds of all thinking people of to-day, to the all so recent infant days of the aeroplane, and in fact, to the history of air transport in Australia, which has been sketched within this lecture.

This is a reminder too that, though secondary to the question as to whether or not our descendants will all be blown off the planet within 100 years, we all have immediate bread-and-butter jobs ahead. The one which we have dealt with here has been the question of Australia and her position in Empire Air Transport, and in pursuance with this we must go ahead and efficiently develop our overseas air routes.

AIR LOADS OF THE NEAR FUTURE

What loads will these "air ships" of the future carry?





(a) Mails should still remain, at least for a time, the No. 1 consideration. In the case of the British, the safe, expeditious and priority carriage of His Majesty's mail throughout the Empire.

We must remember that the United States of America is a great unified nation and homogeneous in itself. So is Russia, but the British have a Mother Country in England, Scotland, Wales and Ireland, and there lies the heart. But their homogeneity is essentially one of a world-scattered collection and is necessary for life itself. Therefore, we have through the Empire a reverence for British mails, as other nationals revere their mails within the bounds of their own countries. Important decisions remain to be taken concerning the use of air letters, Gumbley cards, surcharged letters, or non-surcharged, the introduction of $\frac{1}{4}$ oz. rates, an air parcels post, and so on.

(b) More than ever will the quick carriage of passengers be necessary because of our new-found proximity and identification of interests. These can be divided into officials, business men and women, urgent travellers for private reasons, and the ordinary traveller.

(c) In regard to freights, though in our

time we do not expect to see the air carriage of freights rival in volume that of the ship and railway, there is bound to be a great increase on pre-war figures such as to make them seem small indeed. This is, of course, presuming a state of reasonable International prosperity and freedom of trade.

The classes of freight loading to be expected can be grouped as follows:—

(i) Items of great value such as bullion, currency, precious metals and gems.

In most instances, air carriage constitutes a saving in these cases.

(ii) The thousand and one pieces of machinery and other items necessary to "mend the spoke in the broken wheel" and keep industry and endeavour moving, including drawings and specifications.

(iii) Samples, and first on the market stuff, from Paris frocks and shoes to the latest advertising idea.

(iv) Very high priced commodities which will stand the extra cost of air freight such as drugs, vaccines and concentrated essences.

(v) Highly perishable commodities—"Oranges for Moscow," "Mangoes and passion fruit for London," "Oysters for Singapore," flowers and orchids, rose cuttings, and so on. (Before the war Q.E.A. had conveyed half a million oysters from Sydney to Singapore by Flying-Boat.)

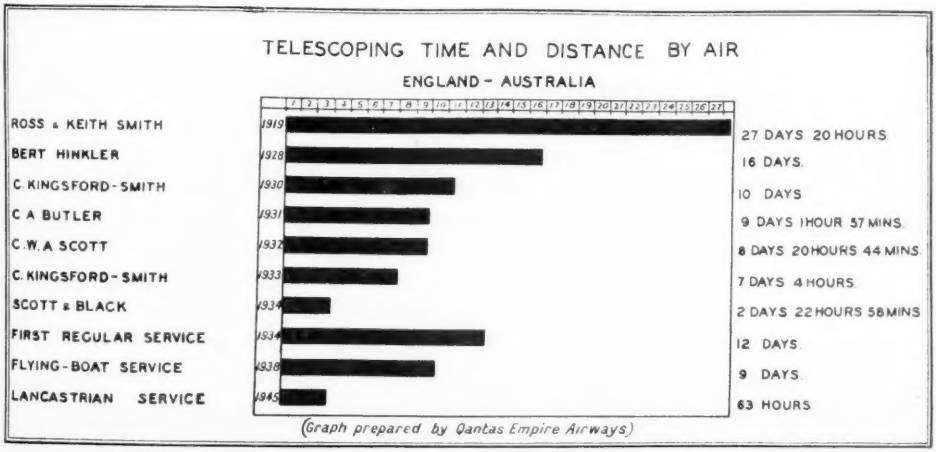
(vi) Lastly will come the "fill up freights," newspapers, small live stock, and "when space is available," bulk consignments.

I think this subject of post-war loadings conjures up a bright vision. What a wonderful new world it will be when a letter from any part of the world to the farthest point in the world can get there in 60 hours! When from Sydney we can be in London or New York or Ottawa the day after to-morrow; Shanghai, Tokyo or Calcutta to-morrow; Singapore and Colombo to-day.

Even to-day, we in Sydney can write on Monday to a friend in London and say, "Dear Bill, I will see you on Saturday in London," and the letter will be delivered on Thursday, and he will have a day or more to spare in getting ready for your arrival.

What strange freights we will receive when all the world can quickly avail itself of the commodities and specialized products of the rest of the world!

All this if we can plan wisely and go forward in a real spirit of co-operation and understanding. Unless, however, the controlling forces of the World can bring into play spiritually newer and higher objectives and the old war-making causes be broken,



(Graph prepared by Qantas Empire Airways)

then the orchids by air, and the healing drugs, and the letters to Bill, will one fine sunny morning be jerked aside and trampled underfoot to make way for a newer and deadlier aerial death.

The history of mankind is written in communications from the day some savage gleefully invented the first wheel, and sent up the first smoke signal. Now it seems that in our own times and the near future, we are destined to see the effect on the peoples of the world, and their affairs, of this crescendo development of air transport which has thrown us all together in a way which challenges our civilization to cope with the new conditions so imposed, and which transcends all questions of Empire or nationalism.

The secret of success lies only in increased co-operation.

A vote of thanks to Mr. Hudson Fysh was proposed by Sir Oliver Simmonds (Vice-President), seconded by Dr. H. Roxbee Cox (Vice-President) and carried with acclamation.

After the Lecture a dinner was given by the Council of the Society at 4, Hamilton Place, which was attended by the following:—

Captain G. U. Allen, Qantas Empire Airways; Mr. E. J. N. Archbold, B.Sc., Grad.R.Ae.S., Member of Council; Air Vice-Marshal D. C. T. Bennett, D.S.O., F.R.Ae.S., Deputy Master, Guild of Air Pilots; Major Eric Boden, Chief Scientific Liaison Officer, Union of South Africa; Lord Brabazon of Tara, M.C., F.R.Ae.S., Past-President, R.Ae.S.; Mr. John Brancker, British Overseas Airways Corporation; Sir William Brown, Permanent Under-Secretary to the Air Ministry; Mr. Griffith Brewer, Hon.F.R.Ae.S., Past-President, R.Ae.S.; Major G. P. Bulman, F.R.Ae.S., Member of Council; Air Commodore K. L. Caldwell, Air Officer Commanding, R.N.Z.A.F.; Mr. S. Camm, C.B.E., F.R.Ae.S., Member of Council; Dr. R. M. Campbell, Acting High Commissioner, Union of South Africa; Air Marshal the Hon. Sir Ralph Cochrane, K.B.E., C.B., A.F.C., Transport Command; Air Vice-Marshal A. C. Collier, C.B., C.B.E., Transport Command; Dr. H. Roxbee Cox, F.R.Ae.S., Vice-President, R.Ae.S.; Mr. W. C. Devereux, F.R.Ae.S., Member of Council; Mr. G. H. Dowty, F.R.Ae.S., Member of Council; Air Marshal Sir Douglas Evill, K.C.B., D.S.O., A.F.C., Vice Chief of the Air Staff; Mr. W. S. Farren, C.B.E., F.R.S., F.R.Ae.S., Member of Council; Major Fish, South African Air Liaison Officer; Mr. H. A. Francis, F.R.Ae.S., Commonwealth Aircraft Corporation Pty., Ltd.; Mr. W. Hudson Fysh, D.F.C., Managing Director, Qantas Empire Airways; Mr. A. Gouge, F.R.Ae.S., Past-President, R.Ae.S.; Major F. B. Halford, F.R.Ae.S., Member of Council; Sir Harold Hartley, Vice-President, L.M.S. Railway; Sir Wilfred Hildred, C.B., O.B.E., M.A., Director-General of Civil Aviation; Mr. J. E. Hodgson, Hon.F.R.Ae.S., Honorary Librarian, R.Ae.S.; The Viscount Knollys, British Overseas Airways Corporation; Captain A. G. Lamplugh, F.R.Ae.S., Honorary Treasurer, R.Ae.S.; Sir George London, Newfoundland Representative C.C. House of Commons; Major R. H. Mayo, O.B.E., M.A., F.R.Ae.S., Member of Council; Major W. A. M. Moore, Secretary, Shipping Air Lines, Limited; Major R. E. Nicoll, Handley Page, Limited; Sir Frederick Handley Page, C.B.E., F.R.Ae.S., President, Royal Aeronautical Society; Mr. R. K. Pierson, C.B.E., F.R.Ae.S., Member of Council, R.Ae.S.; Captain J. L. Pritchard, Hon.F.R.Ae.S., Secretary, Royal Aeronautical Society; Mr. J. D. Rademan, Civil Air Liaison Officer, Union of South Africa; Mr. N. E. Rowe, D.T.D., M.A.P.; The Rt. Hon. Lord Sempill, A.F.C., F.R.Ae.S., Past-President, R.Ae.S.; Major B. W. Shilson, F.R.Ae.S., Member of Council, R.Ae.S.; Sir Oliver E. Simmonds, F.R.Ae.S., Vice-President, R.Ae.S.; Mr. E. Scallan, Secretary to High Commissioner for South Africa; Mr. Ivor Thomas Parliamentary Secretary to the Ministry of Civil Aviation; Captain C. F. Uwins, A.F.C., F.R.Ae.S., Member of Council; Mr. C. C. Walker, F.R.Ae.S., Member of Council; Mr. B. N. Wallis, C.B.E., F.R.S., F.R.Ae.S., Member of Council; Mr. H. E. Wimperis, C.B.E., F.R.S., F.R.Ae.S., Past-President; Mr. L. A. Wingfield, M.C., D.F.C., A.R.Ae.S., Solicitor to the Royal Aeronautical Society.

AN APPRECIATION

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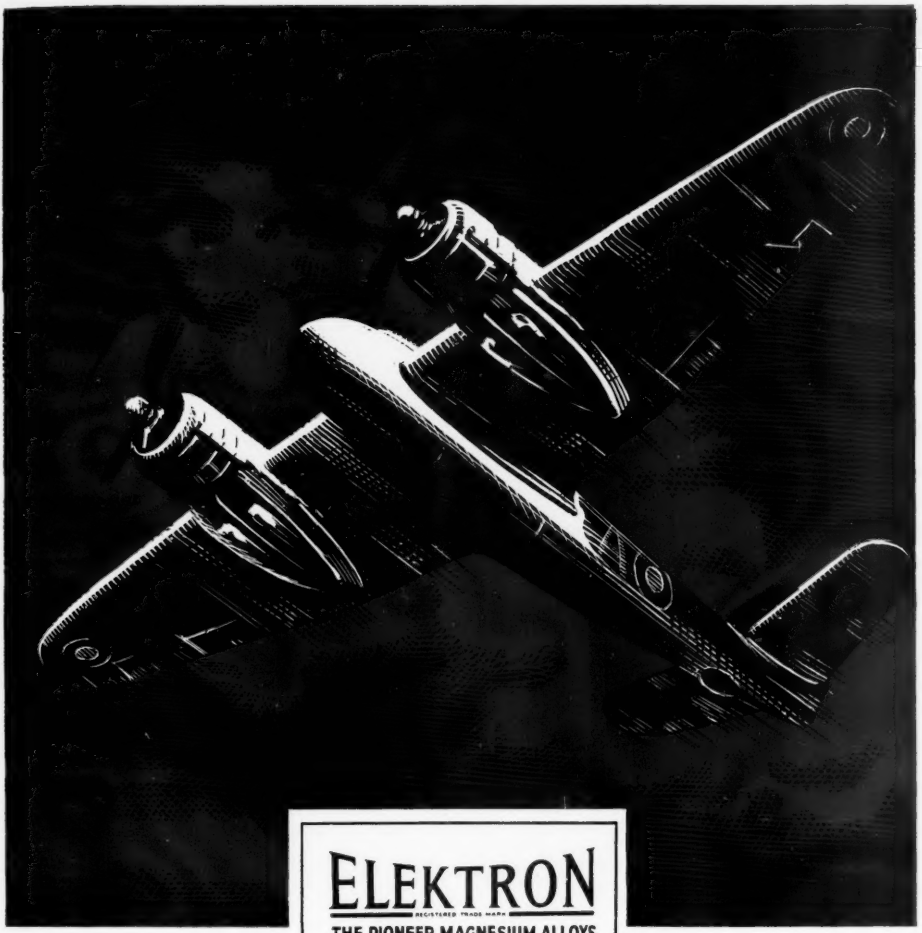

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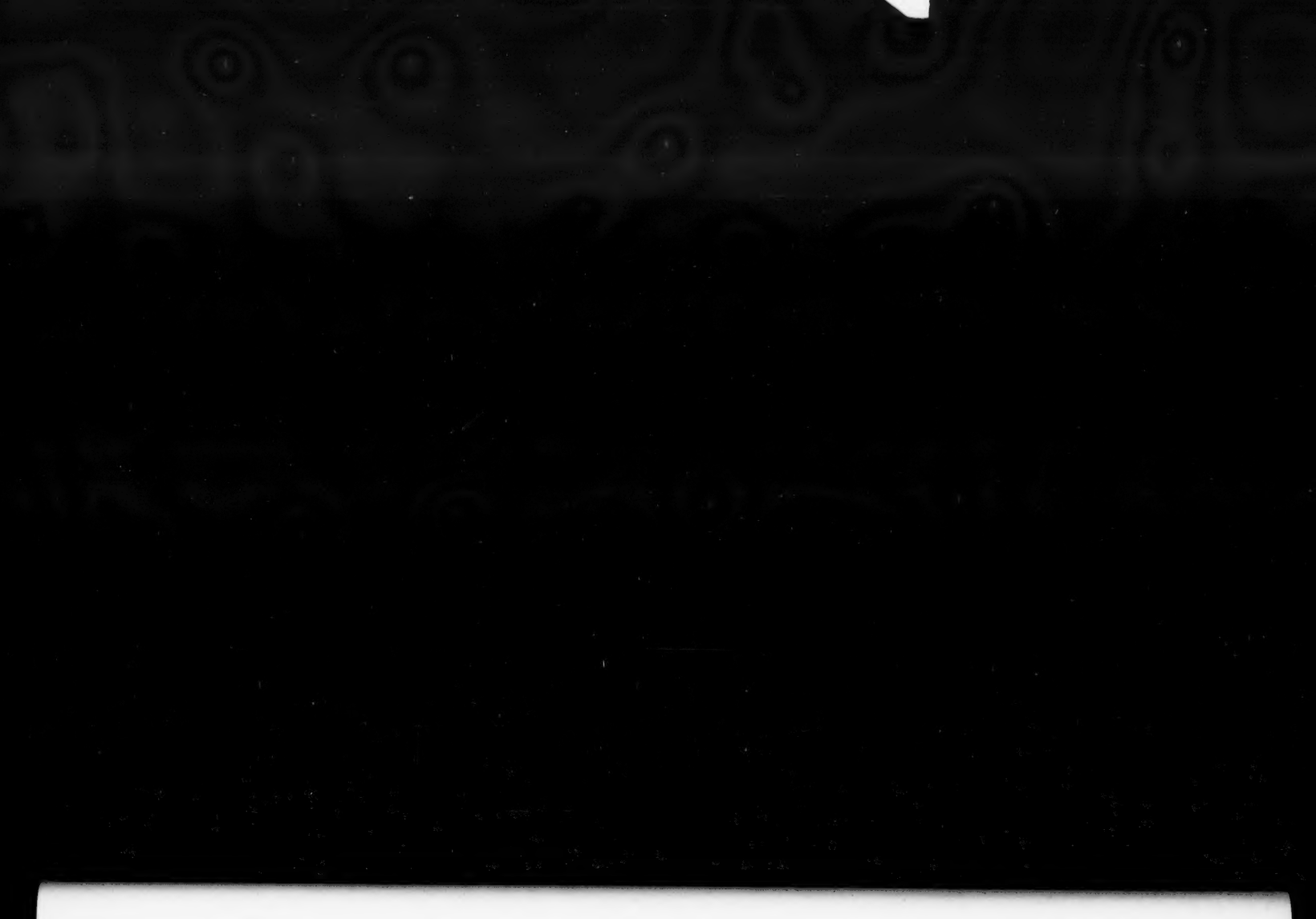
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